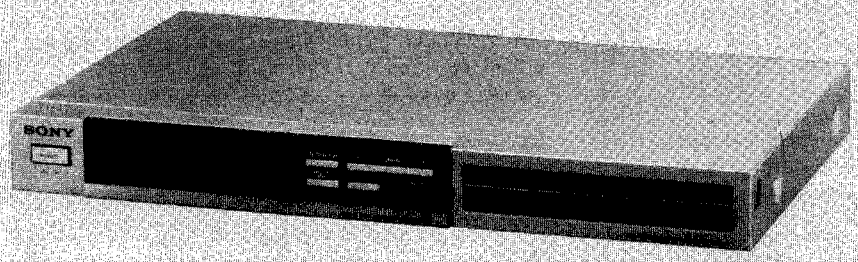
ST-JX44L

AEP Model
UK Model



FM STEREO/FM-AM TUNER

SPECIFICATIONS

FM tuner section

Tuning range 87.5 MHz - 108 MHz
Antenna terminals 300 ohms, balanced
75 ohms, unbalanced
Intermediate frequency
10.7 MHz

	(at 40 kHz deviation)
Sensitivity	at 46 dB quieting 17.3 dBf, 4 μV (mono) 38.3 dBf, 45 μV (stereo)
Usable sensitivity	10.3 dBf, 1.8 μV (IHF) 1.6 μV (S/N = 26 dB)
Signal-to-noise ratio	76 dB (mono) 71 dB (stereo)
Harmonic distortion at 1 kHz	0.08% (mono) 0.15% (stereo)
IM distortion	0.08% (mono) 0.15% (stereo)
Separation at 1 kHz	50 dB
Frequency response	40 Hz – 12.5 kHz ±0.5 dB 30 Hz – 15 kHz $^{+0.5}_{-2.0}$ dB

Selectivity	at 300 kHz 80 dB
Capture ratio	1.0 dB
AM suppression ratio	60 dB
Image response ratio	50 dB
IF response ratio	90 dB
Spurious response ratio	70 dB
RF intermodulation	60 dB (IHF)
Muting threshold	approx. 25.2 dBf, 10 μV
Output level/ impedance	at 75 kHz deviation 750 mV, 4.7 k ohms

– Continued on page 2 –

SAFETY-RELATED COMPONENT WARNING!!

COMPONENTS IDENTIFIED BY SHADING AND MARK ⚠ ON THE SCHEMATIC DIAGRAMS, EXPLODED VIEWS AND IN THE PARTS LIST ARE CRITICAL TO SAFE OPERATION. REPLACE THESE COMPONENTS WITH SONY PARTS WHOSE PART NUMBERS APPEAR AS SHOWN IN THIS MANUAL OR IN SUPPLEMENTS PUBLISHED BY SONY.

ATTENTION AU COMPOSANT AYANT RAPPORT À LA SÉCURITÉ!

LES COMPOSANTS IDENTIFIÉS PAR UNE TRAME ET UNE MARQUE ⚠ SUR LES DIAGRAMMES SCHÉMATIQUES, LES VUES EXPLOSÉES ET LA LISTE DES PIÈCES SONT CRITIQUES POUR LA SÉCURITÉ DE FONCTIONNEMENT. NE REMPLACER CES COMPOSANTS QUE PAR DES PIÈCES SONY DONT LES NUMÉROS SONT DONNÉS DANS CE MANUEL OU DANS LES SUPPLÉMENTS PUBLIÉS PAR SONY.

MICROFILM

SONY®
SERVICE MANUAL

ST-JX44L

MW/LW tuner section

		MW	LW
Tuning range		522 kHz - 1,602 kHz	153 kHz - 344 kHz
Antenna	ferrite-bar antenna	provided	provided
	external antenna terminal	provided	provided
Intermediate frequency		450 kHz	450 kHz
Usable sensitivity	ferrite-bar antenna	200 μV/m (at 1,000 kHz)	500 μV/m (at 230 kHz)
	external antenna	30 μV (at 1,000 kHz)	50 μV (at 230 kHz)
Signal-to-noise ratio		55 dB	55 dB
Harmonic distortion		0.3%	0.3%
Selectivity		35 dB (9 kHz)	35 dB (9 kHz)
Image response ratio		45 dB (at 999 kHz)	45 dB (at 230 kHz)

General

System: PLL quartz-locked digital synthesizer system

System: FM stereo, FM/AM superheterodyne tuner

Power requirements: AEP model: 220 V ac (or 240 V ac adjustable by authorized Sony personnel), 50/60 Hz

UK model: 240 V ac (or 220 V ac adjustable by authorized Sony personnel), 50/60 Hz

Memory back-up power: 3 V dc, two batteries, IEC designation R6 (size AA)
Battery life: approx. 1 year with Sony SUM-3(NS) New Super Batteries

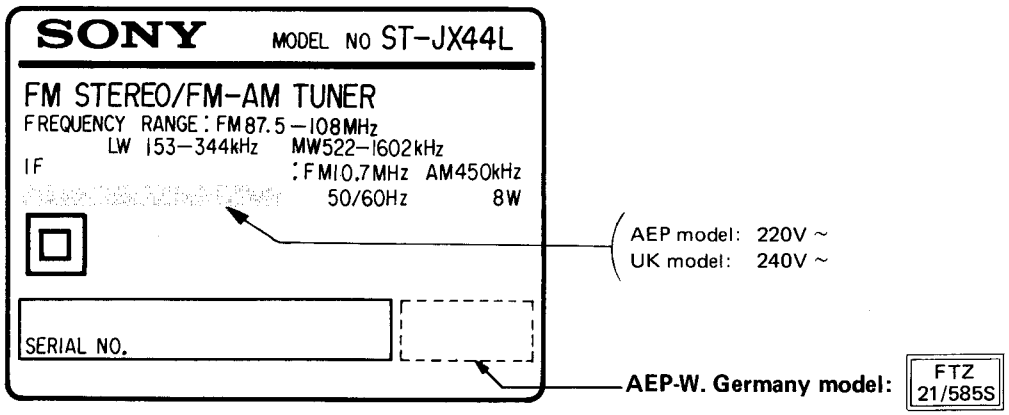
Power consumption: 8 watts

Dimensions: Approx. 430 × 55 × 300 mm (w/h/d) (17 × 2¼ × 11⅞ inches) including projecting parts and controls

Weight: Approx. 2.9 kg (6 lbs 7 oz) net
Approx. 3.4 kg (7 lbs 8 oz) in shipping carton

MODEL IDENTIFICATION

– Specification Label –



FEATURES

The quartz-locked digital frequency-synthesizer system allows accurate and stable tuning that is not affected by temperature variations or long period usage.

Quick and accurate station selection is possible with an electronic digital readout on the frequency display window. Tuning can be done either by changing frequency display reading rapidly, or step by step.

The MEMORY SCAN button allows you to scan automatically the preset stations only, listening to each one for a few seconds to check if there is anything you would like to listen to.

FM muting circuit is incorporated to eliminate any interstation noise. The setting of the STEREO /MUTING switch can also be memorized for each station, and permits one-touch reception with a suitable mode/FM muting setting.

A beat-cut filter for eliminating 114 kHz beats is provided prior to the multiplex circuit to assure better FM stereo reception.

Circuit highlights

Excellent reception characteristics are assured by employing carefully selected parts: a MOS FET in the RF amp. for high sensitivity and excellent spurious response ratio, three uni-phase filters and an IC in the IF amplifier for high selectivity, and a phase-locked loop IC for excellent separation and low-distortion characteristics.

The memory contents are retained by two memory back-up batteries when the power is turned off. These memory back-up batteries also allow the last station tuned in to be held in the memory.

With the RM-44 system remote controller, you can remotely control power on/off and prememorized station selection.

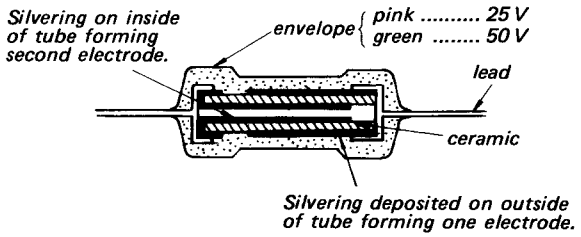
SERVICING NOTES

• THE CERAMIC CAPACITORS

This set uses tube-type ceramic capacitors whose shape is identical with the carbon resistors. Be careful not to use resistors instead of capacitors in repairing.

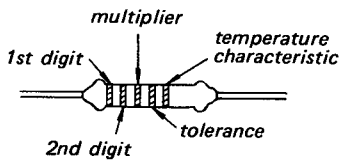
Disc-type ceramic capacitors can be used for replacing those originally used in the set.

Two kinds of drilled holes are provided in some patterns for mounting the tube-type and disc-type ceramic capacitors. Use appropriate holes where applicable.

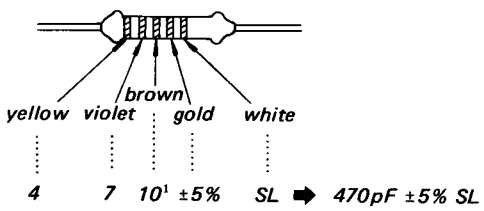

Silvering on inside of tube forming second electrode.
envelope
pink ..... 25 V
green ..... 50 V
lead
ceramic
Silvering deposited on outside of tube forming one electrode.

COLOR CODE (in pF)

Color	1st or 2nd Digit	Multiplier	Tolerance	Temperature characteristic
brown	1	10^1		Y
red	2	10^2		D
orange	3	10^3		
yellow	4	10^4		RH
green	5			
blue	6			
violet	7			UJ
gray	8		±30%	X
white	9			SL
black	0	10^0	±20%	CH
gold		10^{-1}	± 5%	V
silver		10^{-2}	±10%	B

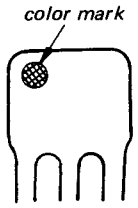


Example:



- **Circuit Connections Depending on the Ceramic Filter (CF101 ~ 103)**

  This set employs five types of ceramic filter which have different center frequency. The pattern connections will be different to match the center frequency with the intermediate frequency. That is, the pattern connections will be different depending on the color mark on the ceramic filter.



Ceramic filter		Jumper wire connection			FM intermediate frequency (MHz)
Color mark	Center frequency (MHz)	J1 (25k)	J2 (50k)	J3 (+/–)	
White	10.750	X	O	O	10.750
Orange	10.725	O	X	O	10.725
Red	10.700	X	X	X	10.700
Blue	10.675	O	X	X	10.675
Black	10.650	X	O	X	10.650

O : connected
X : not connected

FM intermediate frequency is determined by five types as shown above with specifing the state at terminal 24 , 25 and 26 of IC402 by Jumper wire connection.

* CF101, 102 and 103 should be used the ceramic filters of same center frequency.
* Jumper wires (J1-J3) are located in the section "E-4" of the mounting diagram on page 21 or 29.

● Handling Precautions for MOS ICs (IC402: TCP4621BP, IC601: LC4001B, IC701: μPD4011BC)

Generally, the insulation resistance of the oxide layer in MOS IC structures is very high, and the oxide layer is very thin. Because of this, it is possible that the static voltages usually present on clothes and the human body will be enough to generate a potential difference across the insulator, high enough to cause a breakdown of the insulating layer.

The following precautions should be taken while handling these ICs.

(Particular care should be taken under conditions of low humidity.)

Precautions in Replacing MOS ICs

1. Store new ICs by inserting them into a urethane-polyester cushion (which is somewhat conductive), or wrapping it in aluminum foil, so that all the pins are at the same potential.
   (The ICs should be stored in that manner until mounted on the circuit board.)

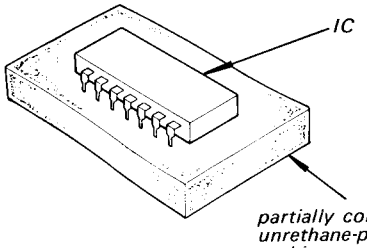


Fig. A

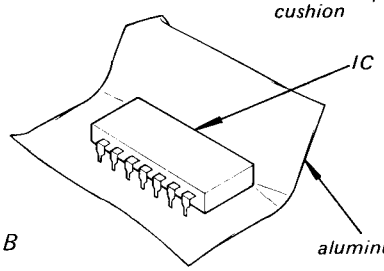


Fig. B

2. Check the soldering iron for possible power-line leakage current. Make sure that there is no leakage path by connecting an ohmmeter to the tip of the soldering iron and the plug as shown in Fig. C. If there is a leakage path, use some other soldering iron.

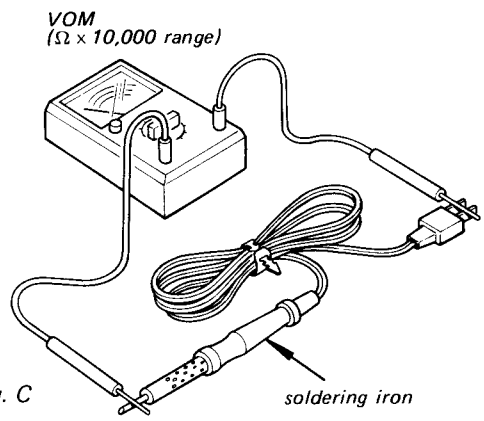


Fig. C

3. Equalize any potential difference between the clothes, the tools in use, the work bench, the set being worked on, and the packaged IC by touching them all in succession with the hands or a conductive wire or tool.
4. The following are effective methods for handling ICs that remove the potential difference across the oxide layer.
   - Use a paper clip modified by soldering in a wire braid insert.

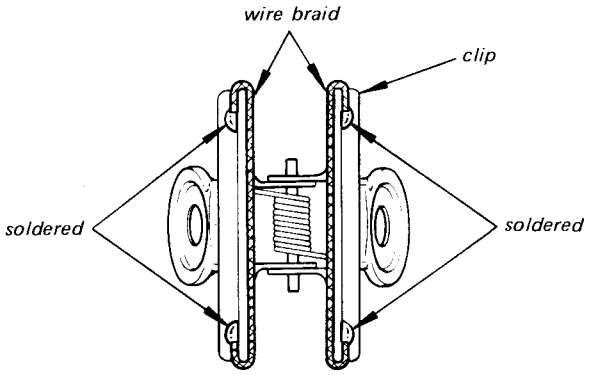


Fig. D

Make sure that there is no solder on the inside.

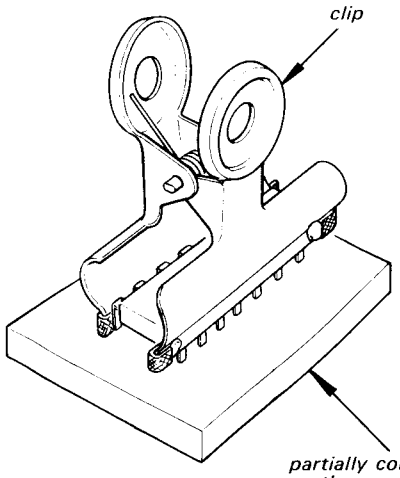
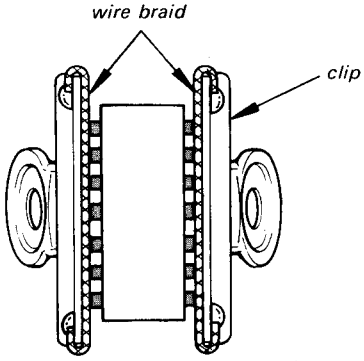


Fig. E



Make sure that all the pins are in contact with the wire braid (all the pins will then be at the same potential.).

Fig. F

- Take a short length of fine bare wire and wind it around the IC so that it shorts all the pins of the IC, while it is still in the urethane-polyester cushion or aluminum foil. This ensures that all the pins are at the same potential.

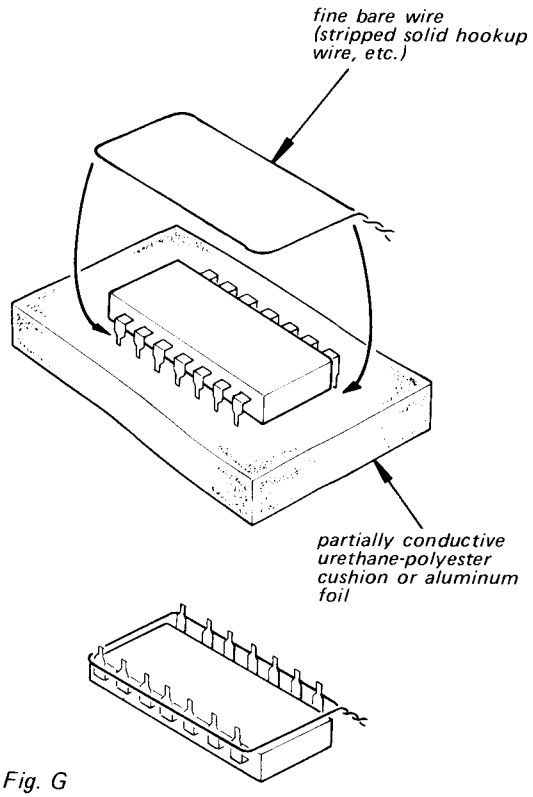


Fig. G

- When it is necessary to handle the IC with the fingers, do not touch any pin, and hold the IC at the ends of its plastic-package case as shown in Fig. H.

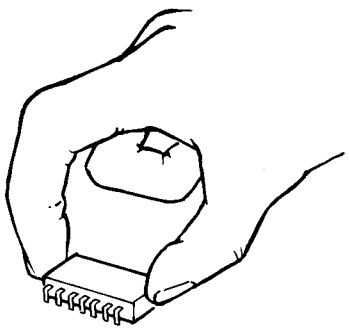


Fig. H

5. Method of Mounting
Insert the IC while holding it with the modified clip, and solder all the pins with the clip still shorting the pins. (Similarly, solder all the pins while the bare shorting wire is still wound around them.). Remove the clip or the bare shorting wire only after all the pins have been soldered.

Precaution while Checking C-MOS ICs

The C-MOS ICs (Complementary MOS) are MOS ICs that have their output sections made up of N-channel and P-channel push-pull stages to increase their speed of operation. If the output terminal of these ICs comes into contact with B+ or B- voltage, then the FET which is ON at that time will either become shorted or open.

This is valid for all the output sections that are connected together by the interconnections. Even the circuits that are physically separated (and not on the same board) can be destroyed simultaneously.

Example:

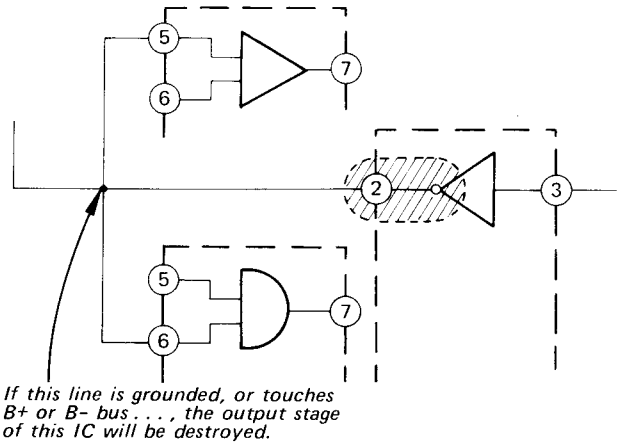
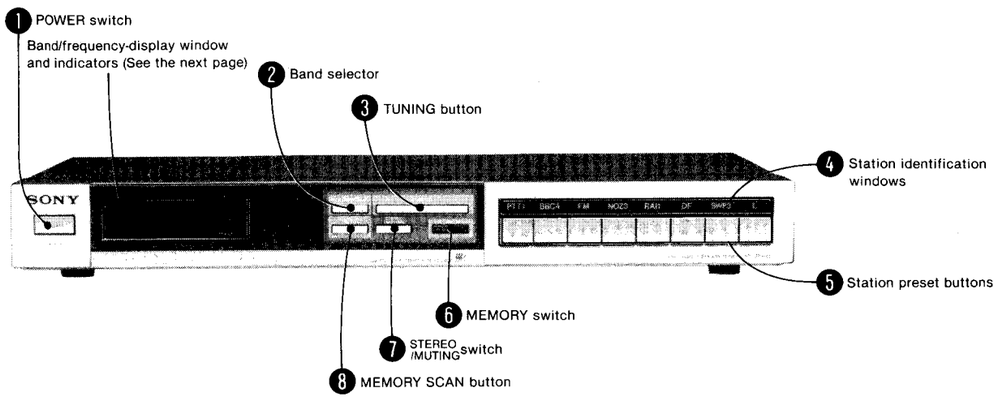


Fig. I

LOCATION AND FUNCTION OF CONTROLS

Before plugging in or attempting to operate this tuner,
it is suggested that you familiarize yourself with all its switches and the purpose of each.
Each number in the photo is keyed to the descriptive text.



❶ POWER switch
Depress to turn on the power. To turn the power off, press the switch again.

❷ Band selector
Selects the desired band: FM, MW or LW. Each time the selector is pressed, the band will change and the selected band will be indicated in the band/frequency-display window.

❸ TUNING button
Press either side of this button to change the frequency. Press the left side [-] to go to a lower frequency and the right side [+] to go to a higher. To change the frequency continuously until the desired frequency is received, keep the button depressed. The frequency figures will change rapidly. To change the frequency slowly (in 0.05 MHz steps for FM, 9 kHz steps for AM and MW and 1 kHz steps for LW), press and immediately release the button.

❹ Station identification windows
Station labels (supplied) identifying pre-memorized stations can be placed in these windows.

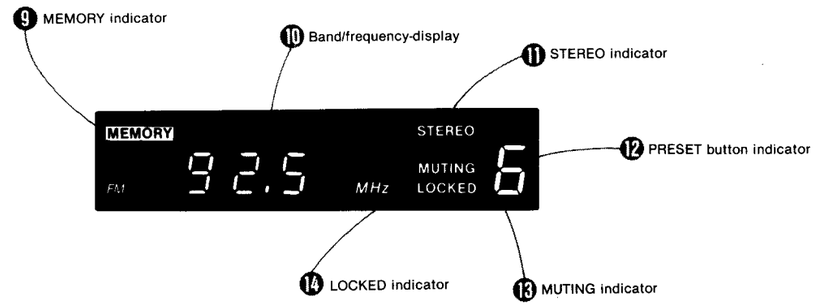
❺ Station preset buttons
To call up a pre-memorized station, press the appropriate button.

❻ MEMORY switch
Press to operate memory circuit. The MEMORY indicator will appear on the band/frequency-display window for a few seconds indicating that the memory circuit is standing by.

❼ STEREO /MUTING switch
This switch serves the dual purpose of a mode and FM muting switch.
Normally keep this switch engaged (the MUTING indicator illuminates) to eliminate FM interstation noise while tuning from station to station. The tuner operates in stereo mode for stereo sound sources and will be automatically switched to mono mode for monaural sound sources.
When you want to tune in a very weak station, or when an FM program is too noisy, press the switch to disengage it. (The MUTING indicator illumination will go out.) This will enable the tuner to receive weak stations, although the stereo feature is sacrificed. In this case, keep the amplifier volume down to avoid speaker damage caused by the interstation noise.

❽ MEMORY SCAN button
Press for automatic scanning of the stations pre-memorized on the station preset buttons.

BAND/FREQUENCY-DISPLAY WINDOW AND INDICATORS



❾ MEMORY indicator
When the MEMORY switch is pressed, "MEMORY" will appear for a few seconds indicating that the memory circuit is standing by.

❿ Band/frequency-display
Permits reading the received frequency at a glance from the figures.

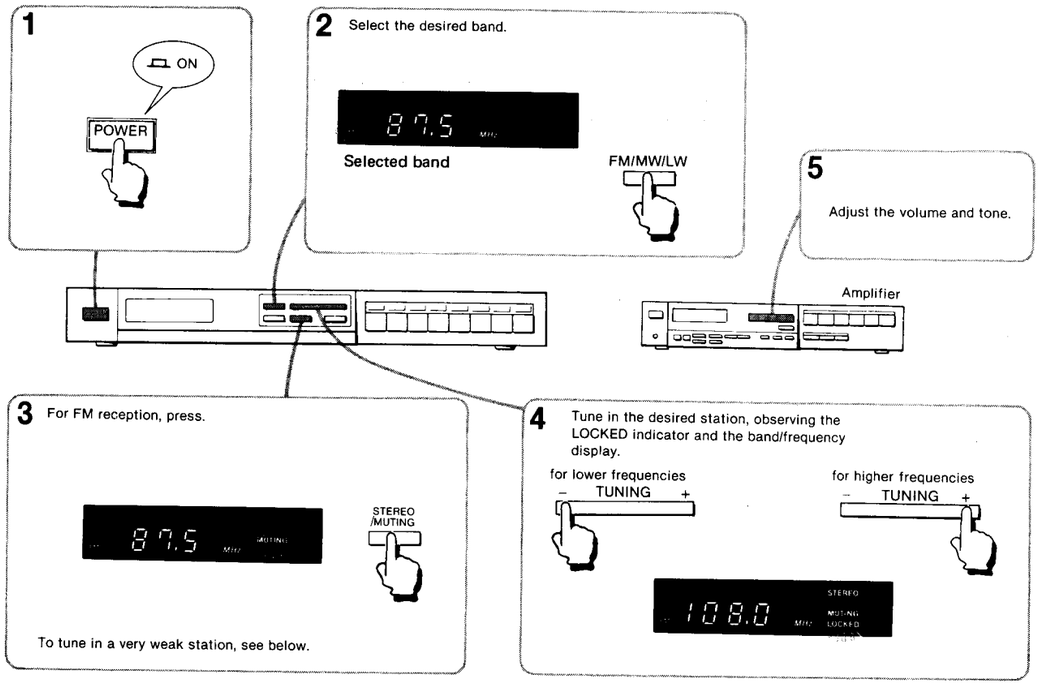
⓫ STEREO indicator
This indicator will light when an FM stereo program of sufficient signal strength is tuned in with the STEREO /MUTING switch engaged.

⓬ PRESET button indicator
When the station preset button is pressed, a figure from 1 to 8 corresponding to the pressed button will appear.
When the MEMORY SCAN button is pressed, the figures will change in sequence.

⓭ MUTING indicator
This indicator illuminates when the STEREO /MUTING switch is engaged.

⓮ LOCKED indicator
This indicator illuminates when a signal stronger than the tuner's muting level is tuned in and locked.

MANUAL TUNING



When the frequency figures reach the end of the tuning range of each band, the frequency will then be scanned from the opposite end of the tuning range.

To tune in a weak or noisy station

●When FM stereo signals are noisy, or to tune in a very weak FM station, lower the volume and disengage the STEREO /MUTING switch by pressing it again. The MUTING indicator illumination will go out. This will result in better reception, at the sacrifice of the stereo effect.

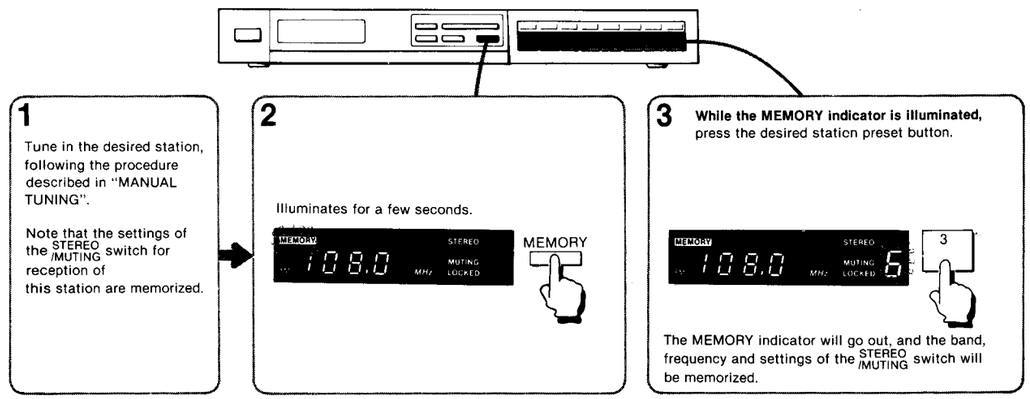
MEMORY PRESET TUNING

This tuner's electronic tuning system (utilizing a PLL—Phase Locked Loop—synthesizer) and a memory circuit make tuning very easy. Once the frequencies of the stations you want to tune in are memorized, all you have to do is push a button.

TO MEMORIZE STATION FREQUENCIES

Preparation : A total of eight station preset buttons can be preset for either FM or AM (MW and LW) in any desired sequence. Arrange the order of stations for each station preset button and note the band and the frequency of each in advance.

Follow the numbered sequence.


1
Tune in the desired station, following the procedure described in "MANUAL TUNING".
Note that the settings of the STEREO /MUTING switch for reception of this station are memorized.
2
Illuminates for a few seconds.
MEMORY
108.0
STEREO
MUTING
LOCKED
MEMORY
3 While the MEMORY indicator is illuminated, press the desired station preset button.
MEMORY
108.0
STEREO
MUTING
LOCKED
3
The MEMORY indicator will go out, and the band, frequency and settings of the STEREO /MUTING switch will be memorized.

Repeat these steps for each station preset button.

Replace the station labels to conform to the selected pre-memorized stations.

Notes

●The MEMORY indicator will go off automatically after a few seconds. When the indicator is out, the memory circuit does not operate to memorize the station.

●The previous memory will be erased when a new frequency is committed to the memory of the same button. An erasure cannot be made without a new input.

TO CHECK A PRE-MEMORIZED FREQUENCY

After the memory procedure is completed, confirm the pre-memorized frequency. Press the TUNING button and change the frequency display indication. Press the station preset button to be checked. The frequency which had been pre-memorized should then be indicated in the band/frequency-display window.

TO RECEIVE A PRE-MEMORIZED STATION

Turn the POWER switch on and simply press the desired station preset button.

Memory of the last received station

This tuner includes a memory circuit to remember the station which had been received for more than one second just before the power was turned off. This station will be automatically tuned in when the power is turned on again. This memory system enables you to make a timer-activated recording from the tuner.

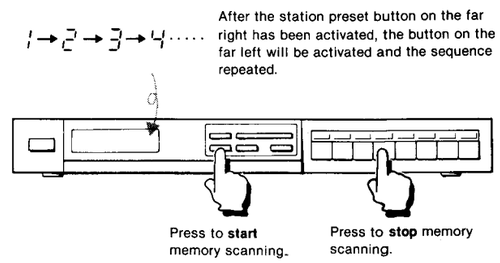
MEMORY SCANNING

The MEMORY SCAN button allows you to quickly hear what kind of programs are being broadcast by the pre-memorized stations.

When you press the MEMORY SCAN button, the pre-memorized stations are automatically received in order from the pre-memorized station to the immediate right of the station being received for about 4 seconds each.

Pushing a particular station preset button stops the scanning.

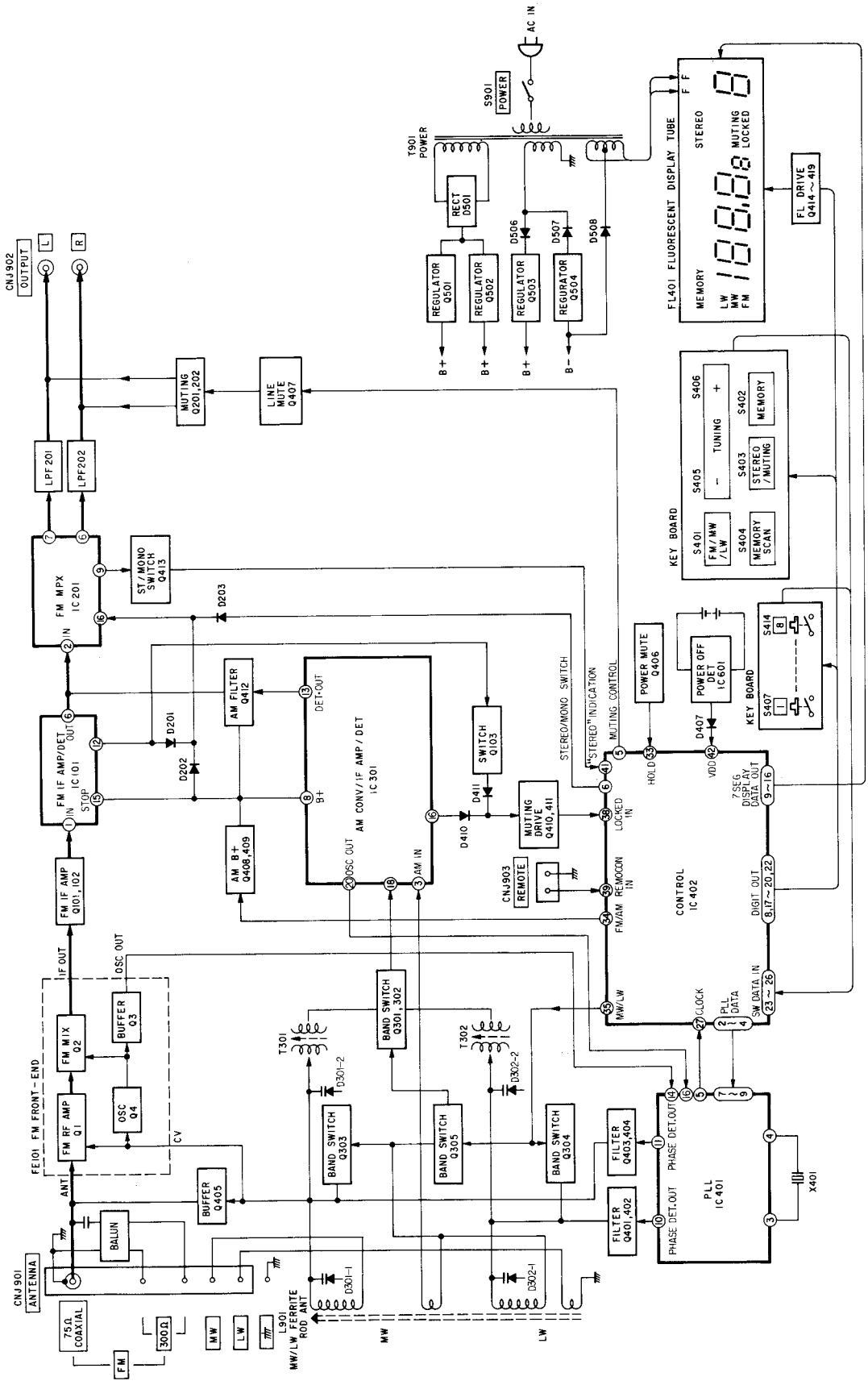
The scanning sequence will be shown by the flickering of the figure in the band/frequency display window.


1→2→3→4.....
After the station preset button on the far right has been activated, the button on the far left will be activated and the sequence repeated.
Press to **start** memory scanning.
Press to **stop** memory scanning.

When you press the MEMORY SCAN button during manual tuning, scanning will start from the station memorized on the leftmost station preset button.

SECTION 1
OUTLINE

• BLOCK DIAGRAM



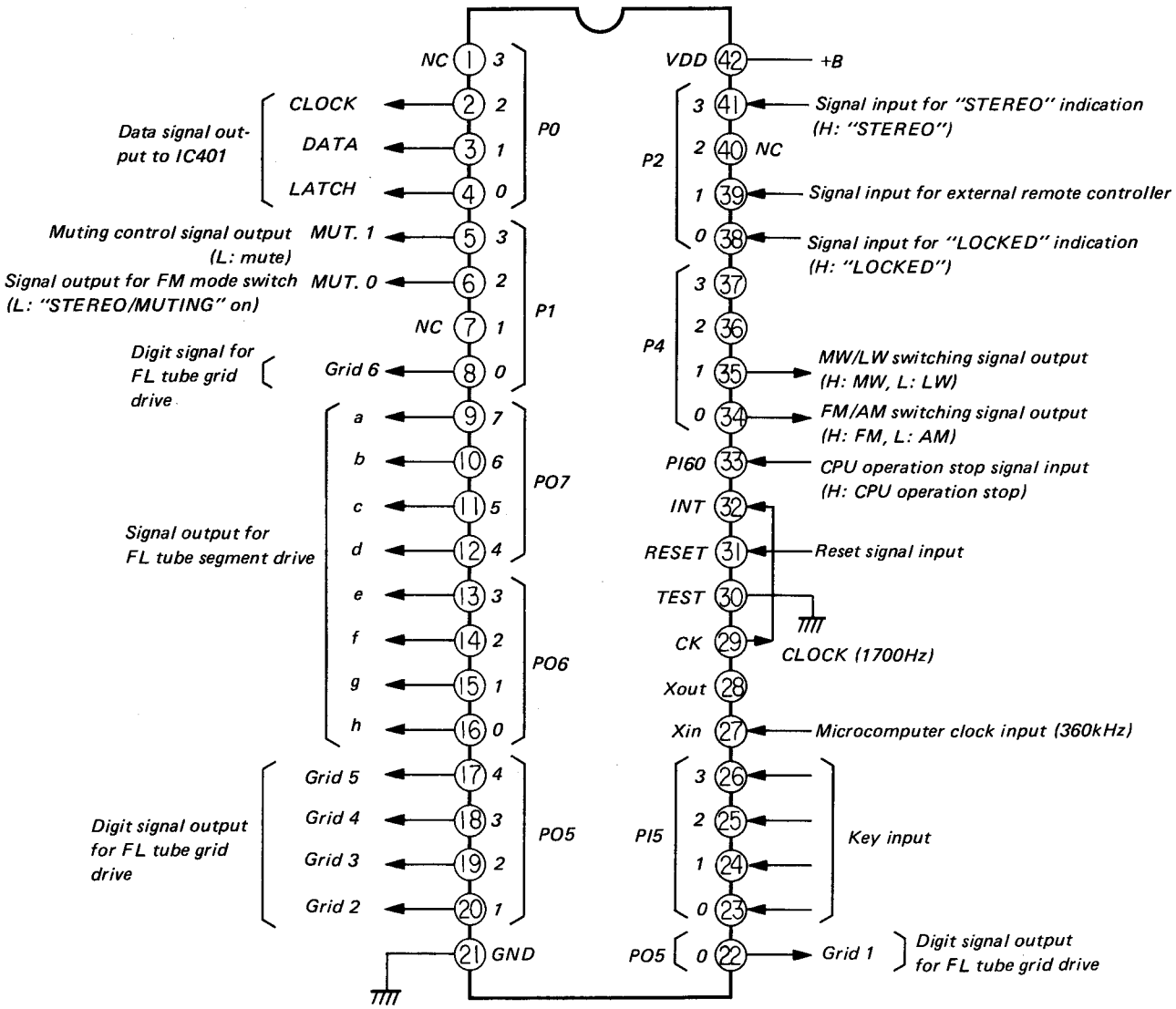
• CONTROLLER IC TCP4621BP-6504/-6505

IC402 (TCP4621BP-6504/-6505) is a microcomputer IC.
The terminal functions are as follows:
Main Functions:

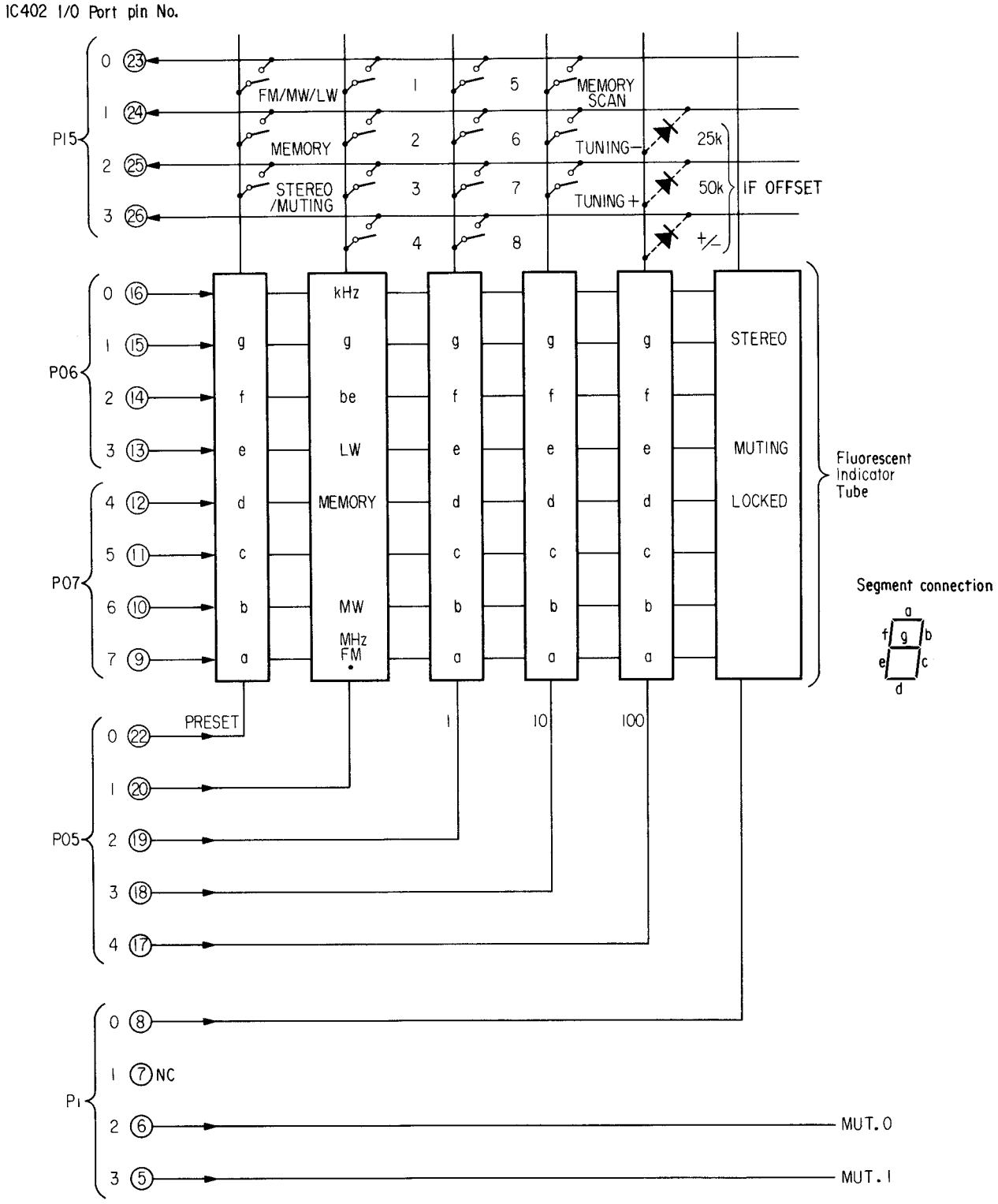
- Key input detection
- Fluorescent indicator tube (FL401) indication output
- Data transmission to PLL frequency synthesizer IC (IC401: CX778A) (16 bit serial data)

IC402 Terminal Functions

FL tube . . . Fluorescent Indicator Tube



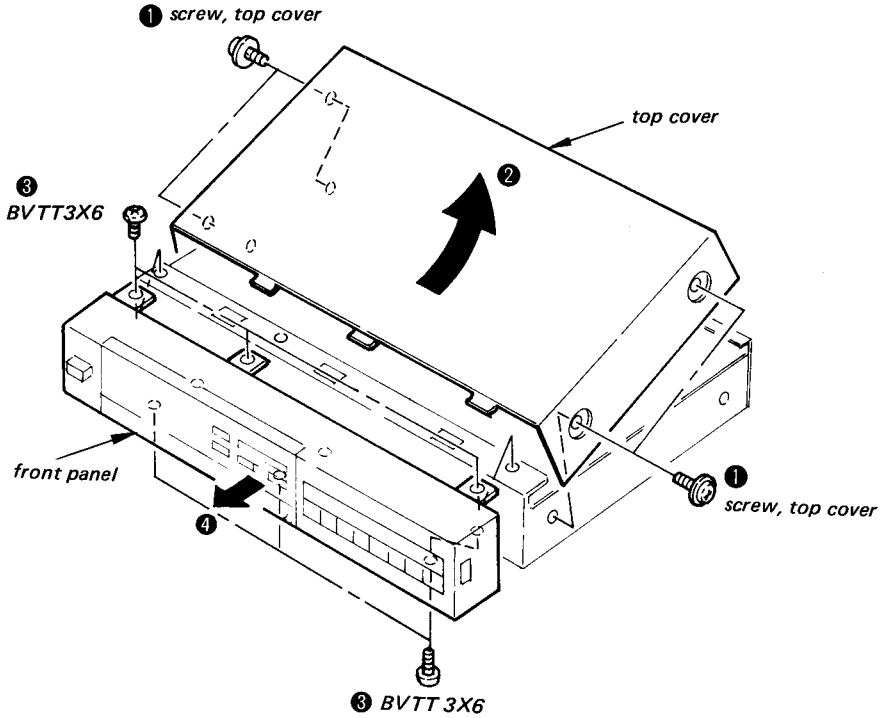
• SWITCH AND DISPLAY MATRIX



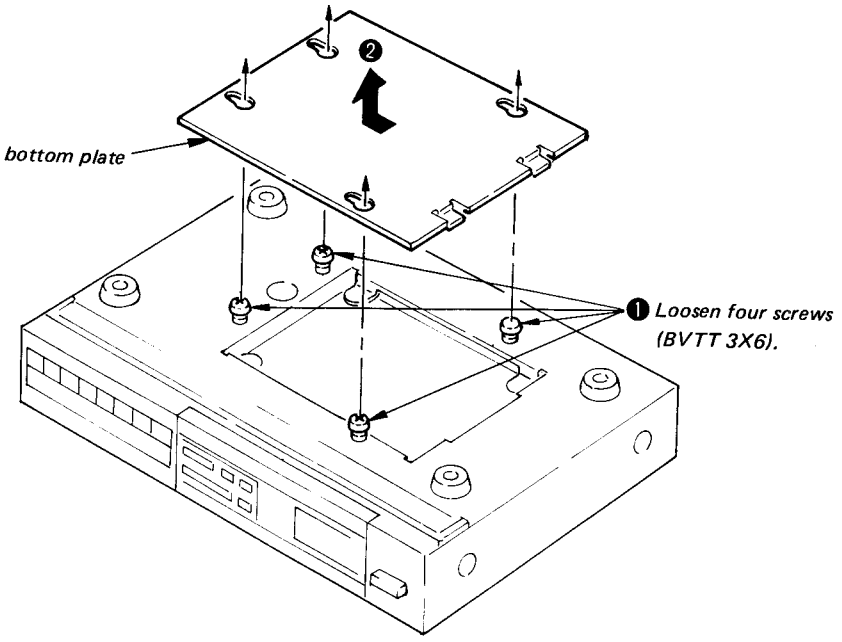
SECTION 2
DISASSEMBLY

• Follow the disassembly procedure in the numerical order given.

TOP COVER and FRONT PANEL REMOVAL



BOTTOM PLATE REMOVAL

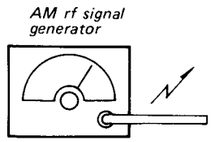


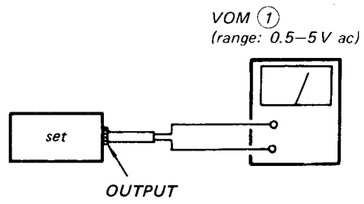
SECTION 3
ADJUSTMENTS

MW/LW SECTION

Setting:

Band Selector: MW/LW

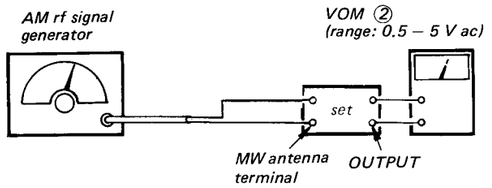




- Repeat the procedures in each adjustment several times, and the frequency coverage and tracking adjustments should be finally done by the trimmer capacitors.

AM IF ALIGNMENT

Procedure:



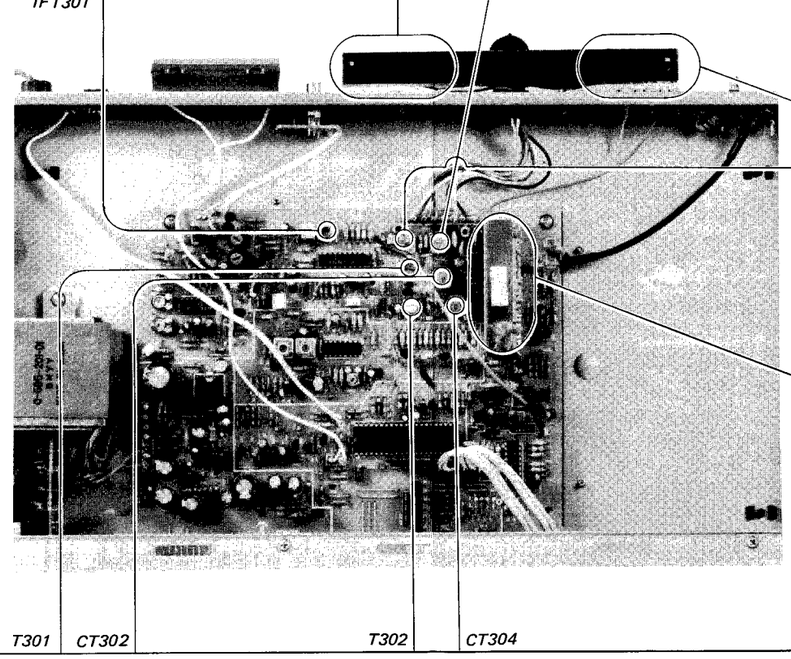
Carrier frequency: 1,404 kHz
30% amplitude modulation by 400 Hz signal
Output level: as low as possible

1. Tune the set to 1,404 kHz and adjust IFT301 for a maximum reading on VOM (2) .

Note: Traking adjustment of LW section should be made earlier than that of MW section.

MW TRACKING ADJUSTMENT	
Adjust for a maximum reading on VOM (1) .	
L901-1	603 kHz
CT301	1,395 kHz

LW TRACKING ADJUSTMENT	
Adjust for a maximum reading on VOM (1) .	
L901-2	173 kHz
CT303	308 kHz



MW/LW FREQUENCY COVERAGE ADJUSTMENT

- **MW**

Frequency Display	1,602kHz	522 kHz
Voltage at TP4	22 V	1.6 V
Adjustment Parts	CT302	T301

- **LW**

Frequency Display	344 kHz	153 kHz
Voltage at TP5	18.5 V	2.2 V
Adjustment Parts	CT304	T302

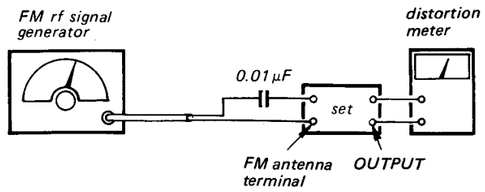
FM SECTION

FM Discriminator Alignment

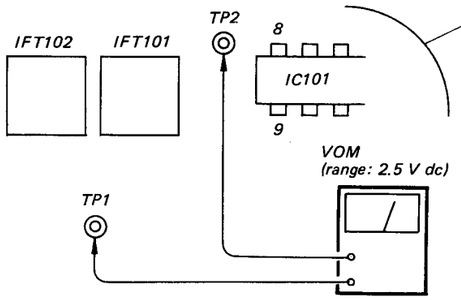
Setting:

STEREO/MUTING switch: OFF

Procedure:



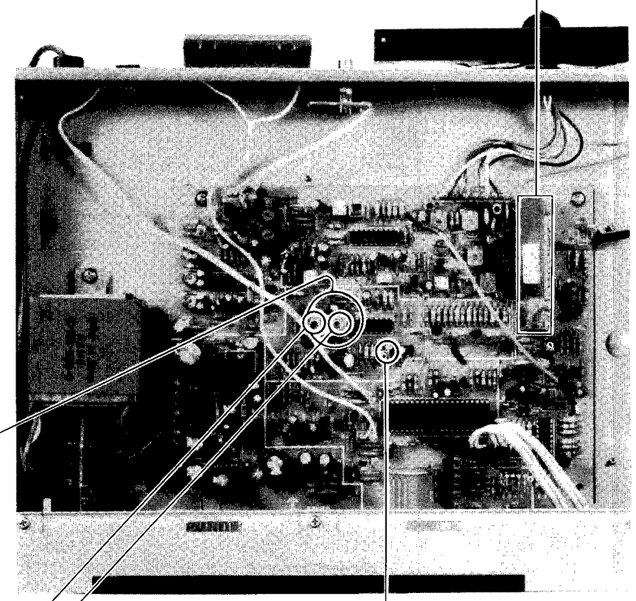
Carrier frequency: 98 MHz
Output level: 1 mV (60 dB)
Modulation: 400 Hz, 40 kHz deviation (100%)



1. Tune the set to 98MHz.
2. Connect a VOM to NULL test point and adjust the primary-side core (IFT101) for 0V DC reading on the VOM.
3. Adjust the secondary-side core (IFT102) for a minimum reading on the distortion meter.

Note: Repeat the secondary-side and primary-side adjustments several times.

The FM front-end is carefully adjusted at the factory and is supplied as one whole block for replacement.

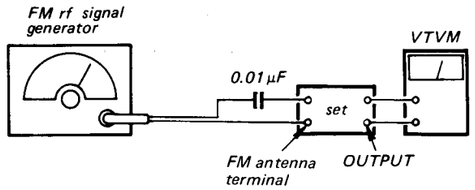


FM Muting Level Adjustment

Setting:

STEREO/MUTING switch: ON

Procedure:



Carrier frequency: 98 MHz
Modulation: 400 Hz, 40 kHz deviation (100%)
Output level: 17.8µV (25 dB)

1. Tune the set to 98MHz by pressing the MANUAL TUNING switches.
2. Adjust RT101 for a 0V reading on the VTVM.

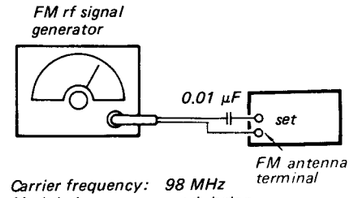
VCO Adjustment

Setting:

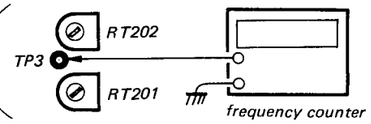
STEREO/MUTING Switch: OFF

A) Regular Method

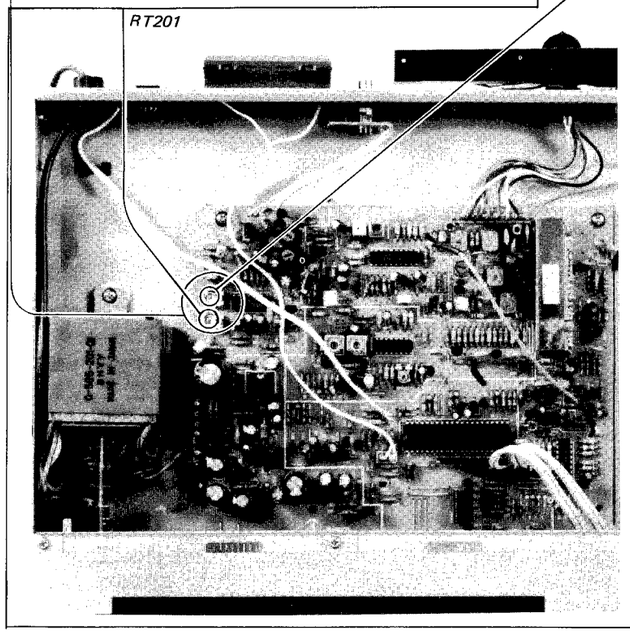
Procedure:



Carrier frequency: 98 MHz
Modulation: no modulation
Output level: 1 mV (60 dB)



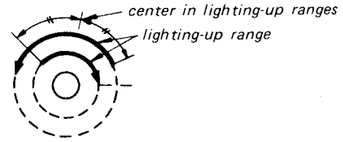
1. Tune the set to 98 MHz.
2. Adjust RT201 for 19 kHz ± 50 Hz on the counter.



B) Simple Method

Procedure:

1. Tune the set to the FM stereo broadcasting signal.
2. Turn RT201 clockwise or counterclockwise and memorize the lighting-up range of the stereo lamp.
3. Secure RT201 at the center of the lighting-up range of both turns as shown below.

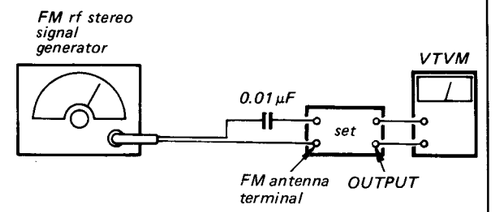


FM Stereo Separation Adjustment

Setting:

STEREO/MUTING switch: ON

Procedure:



Carrier frequency: 98 MHz
Output level: 1 mV (60 dB)
Modulation:

Audio (400 Hz): 16.25 kHz deviation (40%)
Pilot (19 kHz): 7.5 kHz deviation (19%)
Sub-channel: 16.25 kHz deviation (40%)

FM stereo signal generator output channel	VTVM connection	VTVM reading (dB)
L-CH	L-CH	Ⓐ
R-CH	L-CH	Ⓑ Adjust RT202 for minimum reading.
R-CH	R-CH	Ⓒ
L-CH	R-CH	Ⓓ Adjust RT202 for minimum reading.

L-CH Stereo separation: Ⓐ – Ⓑ
R-CH Stereo separation: Ⓒ – Ⓓ

The separations of both channels should be equal.

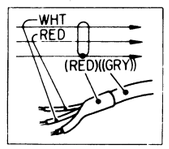
AEP—W. Germany model: Serial No. up to 506500.
AEP model: Serial No. up to 505600.
UK model: Serial No. up to 603000.

SECTION 4
DIAGRAMS

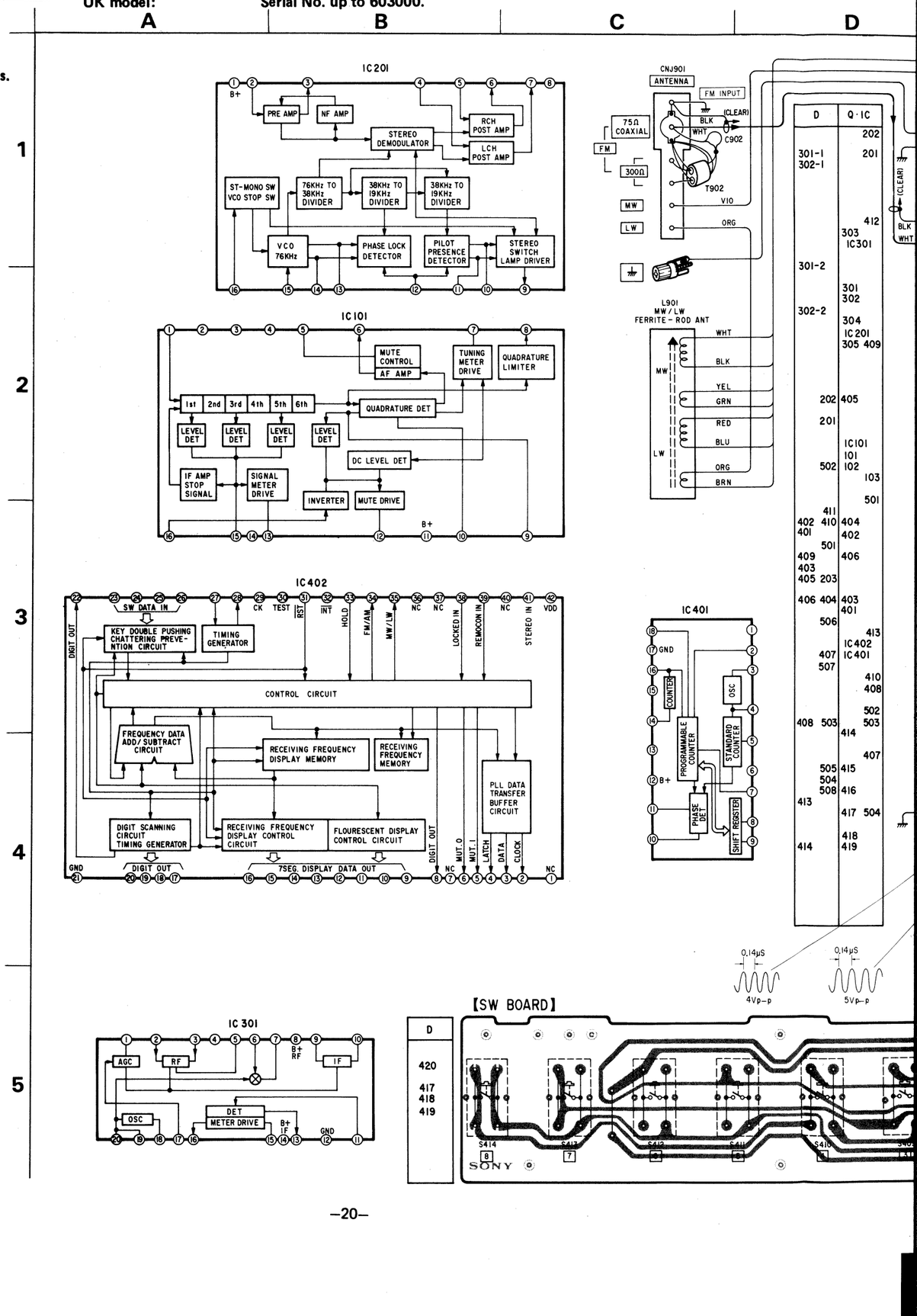
4-1. MOUNTING DIAGRAM

See page 27 for the semiconductor lead layouts.

- Color code of sleeving over the end of the jacket.



- ▒▒ : B+ pattern
- ▬▶▬ : signal path
- ▬▬▶ : L-CH signal path
- ▬··▶ : R-CH signal path
- Refer to page 4 for connection of jumper wires (J1-J3).



AEP-W. Germany model: Serial No. up to 506500.
AEP model: Serial No. up to 505600.
UK model: Serial No. up to 603000.

ST-JX44L ST-JX44L

D E F G H I J K

【TUNER BOARD】

【OUTPUT BOARD】

【REMOCON BOARD】

【AC SW BOARD】

【MICON SUB BOARD】

BATTERY CASE

D	Q・IC
	202
301-1	201
302-1	
	412
	303
	IC301
301-2	
	301
	302
302-2	
	304
	IC201
	305 409
	202 405
	201
	IC101
	101
502	102
	103
	501
411	
402 410	404
401	402
501	
409	406
403	
405 203	
406 404	403
	401
506	
	413
	IC402
407	IC401
507	
	410
	408
	502
408 503	503
	414
	407
505	415
504	
508	416
413	
	417 504
	418
414	419

D・IC
IC601
601

IC601

Q・IC			
703	IC701	701	702

IC701

AEP—W. Germany model: Serial No. up to 506500.
AEP model: Serial No. up to 505600.
UK model: Serial No. up to 603000.

ST-JX44L ST-JX44L

A B C D E F G H

1 2 3 4 5

【TUNER BOARD】

CNJ901 ANTENNA
75Ω COAXIAL
FM
300Ω
FM INPUT
MW
LW

FE101 FM FRONT-END
(AEP-W.Germany model is different in some points.)
Q1 FM RF AMP
Q2 FM MIX
Q3 BUFFER
Q4 OSC
IFT1
VCC
IF OUT
ANT
GND
OSC OUT
CV

Q405 2SC1364
BUFFER

L901 MW/LW FERRITE ROD ANT

D301,302 KV-1226

Q301 2SA1115
Q302-305 2SC1364
BAND SWITCH

Q101,102 2SC710-14
FM IF AMP

IC101 LA1231
FM IF AMP/DET
QUADRATURE LIMITER
QUADRATURE DET
TUNING METER DRIVE
AF AMP MUTE CONTROL
IF AMP STOP SIGNAL
SIGNAL METER DRIVE
INVERTER
MUTE DRIVE
DC LEVEL DET
MUTING LEVEL

Q103 2SC1364
SWITCH
D410,411 1S1555

Q408,409 2SC1364
— AM B+ —

IC201 μPC1235C
FM MPX
PRE AMP
NF AMP
STEREO DEMODULATOR
ST-MONO SW
VCO STOP SW
76kHz TO 38kHz DIVIDER
38kHz TO 19kHz DIVIDER
VCO 76kHz
PHASE LOCK DETECTOR
D201—203 1S1555
VCO

IC301 LA1245
AM CONV/IF AMP/DET
B+(RF)
RF
AGC
OSC
B+(IF)
IF
DET
METER DRIVE

Q409 Q412 Q410 Q408
D411 D410

【REMOCON BOARD】
CNJ903 REMOTE
TO MICON SUB BOARD

D403-406 1S1555

IC402 TCP4621BP-6504
CONTROL
PLL DATA TRANSFER BUFFER CIRCUIT
CONTROL CIRCUIT
RECEIVING FREQUENCY MEMORY
FREQUENCY DATA ADD/SUBTRACT CIRCUIT
RECEIVING FREQUENCY DISPLAY MEMORY
TIMING GENERATOR
KEY DOUBLE PUSHING CHATTERING PREVENTION CIRCUIT
DIGIT SCANNING CIRCUIT TIMING GENERATOR
RECEIVING FREQUENCY DISPLAY CONTROL CIRCUIT
FLOURESCENT DISPLAY CONTROL CIRCUIT
SW DATA IN
DIGIT OUT
7 SEG. DISPLAY DATA OUT
REMOCON IN
STEREO IN
LOCKED IN
DIGIT OUT

Q412 2SC1364
AM FILTER
Q410 2SC1364
MUTING DRIVE
Q406 2SC1364
POWER MUTE
Q407 2SA1115
LINE MUTE
IC601 LC-4001B
POWER OFF DET.
D407,409 1S1555
D408 SV-03
D601 IS2473

Q414-419 2SC1364
FL DRIVE
FL401
MEMORY
LW MW FM

IC401
PHASE DET
COUNTER
STANDARD COUNTER
PROGRAMMABLE COUNTER
SHIFT REGISTER
OSC

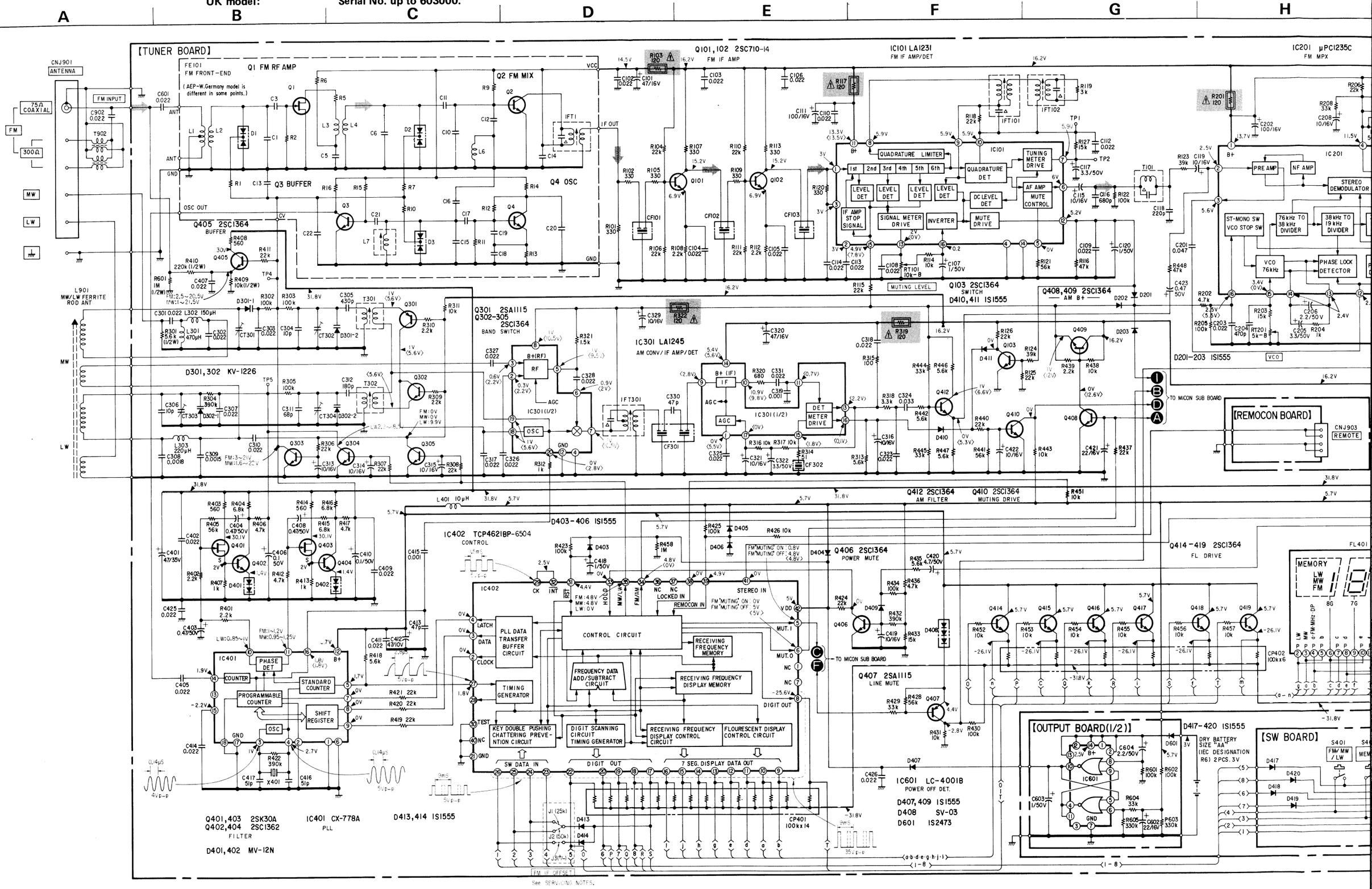
Q401,403 2SK30A
Q402,404 2SC1362
FILTER
D401,402 MV-12N
IC401 CX-778A
PLL
D413,414 1S1555

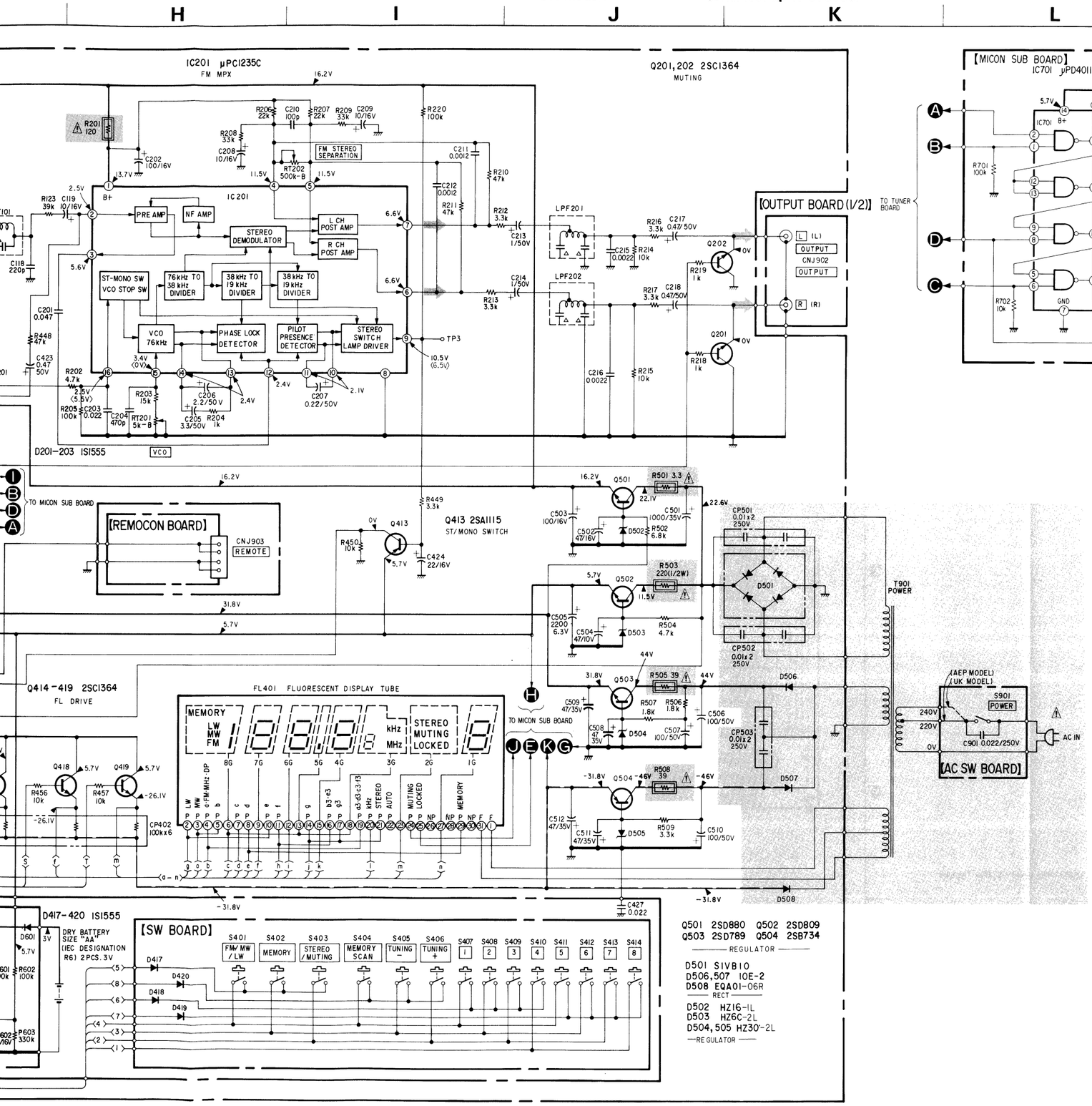
【OUTPUT BOARD(1/2)】
D417-420 1S1555
DRY BATTERY SIZE "AA" (IEC DESIGNATION R6) 2PCS. 3V
【SW BOARD】
S401 FM/MW/LW
S402 MEMORY

FM IF OFFSET
See SERVICING NOTES.

AEP—W. Germany model: Serial No. up to 506500.
AEP model: Serial No. up to 505600.
UK model: Serial No. up to 603000.

ST-JX44L ST-JX44L





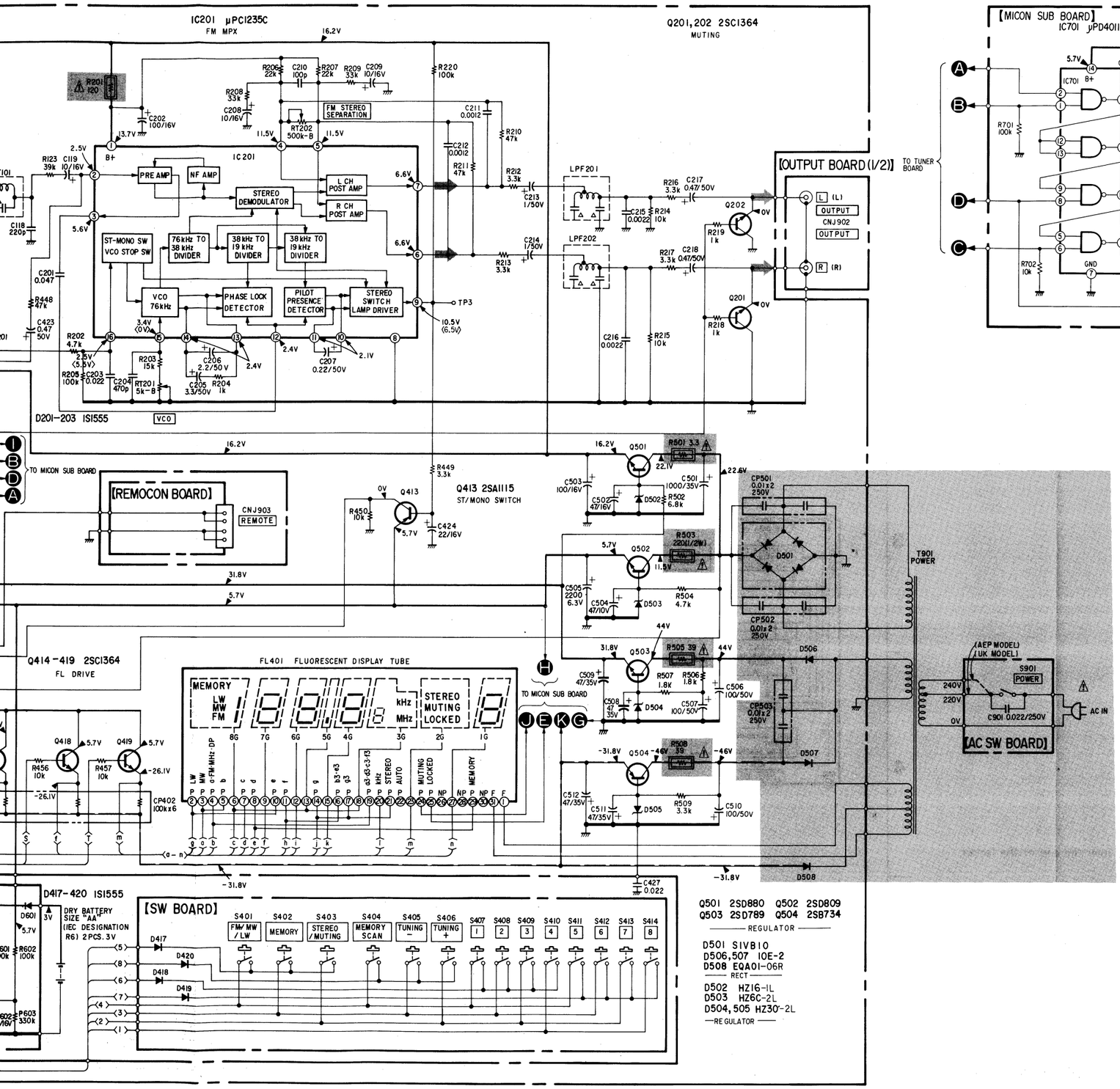
- All capacitors are in μF unless otherwise noted. pF : μμF 50WV or less are not indicated except for electrolytics and tantalums.
- All resistors are in ohms, ¼W unless otherwise noted. kΩ : 1000Ω, MΩ : 1000kΩ
- : nonflammable resistor.
- △ : internal component.
- : panel designation.
- : adjustment for repair.
- ——: B+ bus.
- – – –: B– bus.
- Voltages are dc with respect to ground unless otherwise noted.
- Readings are taken under no-signal (detuned) conditions with a VOM (50 kΩ/V).
  NO MARK : FM
  < > : AM (MW/LW)
- Voltage variations may be noted due to normal production tolerances.
- Signal path

Note: The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

AEP—W. Germany model: Serial No. up to 506500.
AEP model: Serial No. up to 505600.
UK model: Serial No. up to 603000.

ST-JX44L ST-JX44L

H I J K L M

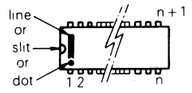


- All capacitors are in μF unless otherwise noted. pF : μμF 50WV or less are not indicated except for electrolytics and tantalums.
- All resistors are in ohms, ¼W unless otherwise noted. kΩ : 1000Ω, MΩ : 1000kΩ
- : nonflammable resistor.
- △ : internal component.
- : panel designation.
- : adjustment for repair.
- ——: B+ bus.
- – – –: B– bus.
- Voltages are dc with respect to ground unless otherwise noted.
- Readings are taken under no-signal (detuned) conditions with a VOM (50 kΩ/V).
  NO MARK : FM
  < > : AM (MW/LW)
- Voltage variations may be noted due to normal production tolerances.
- Signal path

Note: The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

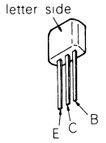
Semiconductor Lead Layouts

μPD4011BC
CX778A
LA1231
LA1245
LC4001B
TCP4621BP
μPC1235C

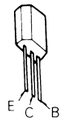


(Top view)

2SA1115



2SA1027R

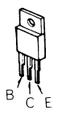


2SB734
2SD774

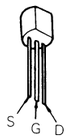
2SC710

2SA1015
2SC1362
2SC1364
2SC1815

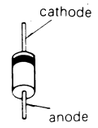
2SD880



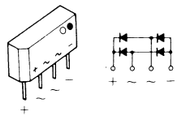
2SK30A-GR3



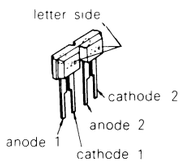
10E2
1S1555
1S2473
EQA01-06R
HZ30-2L
HZ6C2L



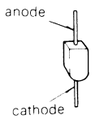
S1VB10
S1VB20



KV1226

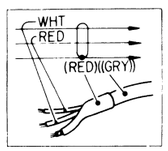


SV-03



MV-12N

- Color code of sleeving over the end of the jacket.

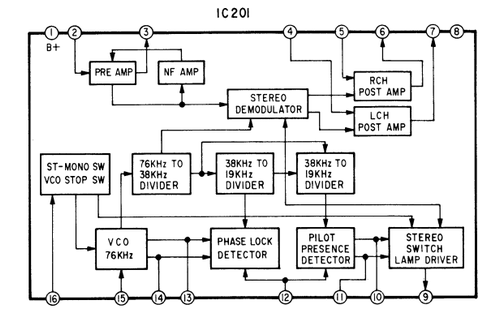


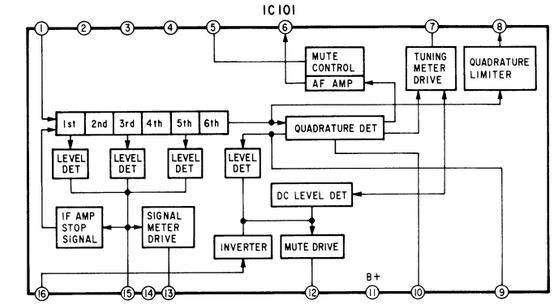
- ▒ : B+ pattern
- ▬▶▬ : signal path
- ▬▪▬▶ : L-CH signal path
- ▬▪▪▬▶ : R-CH signal path
- Refer to page 4 for connection of jumper wires (J1-J3).

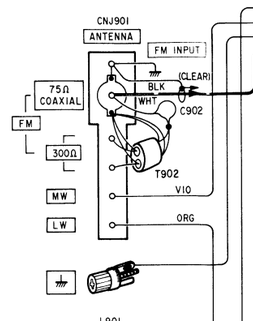
AEP–W. Germany model: Serial No. 506501 and later.
AEP model: Serial No. 505601 and later.
UK model: Serial No. 603001 and later.

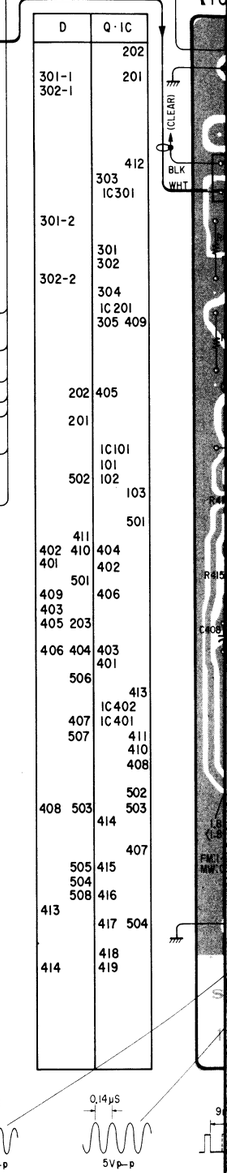
A B C D

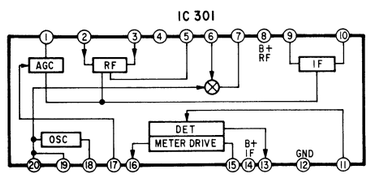
1 2 3 4 5

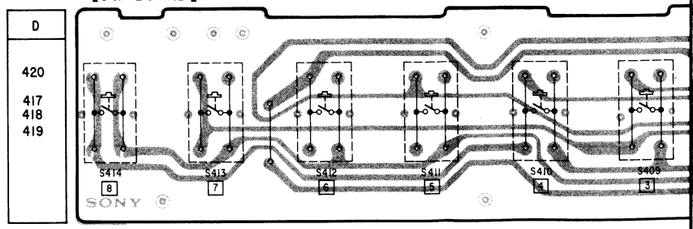










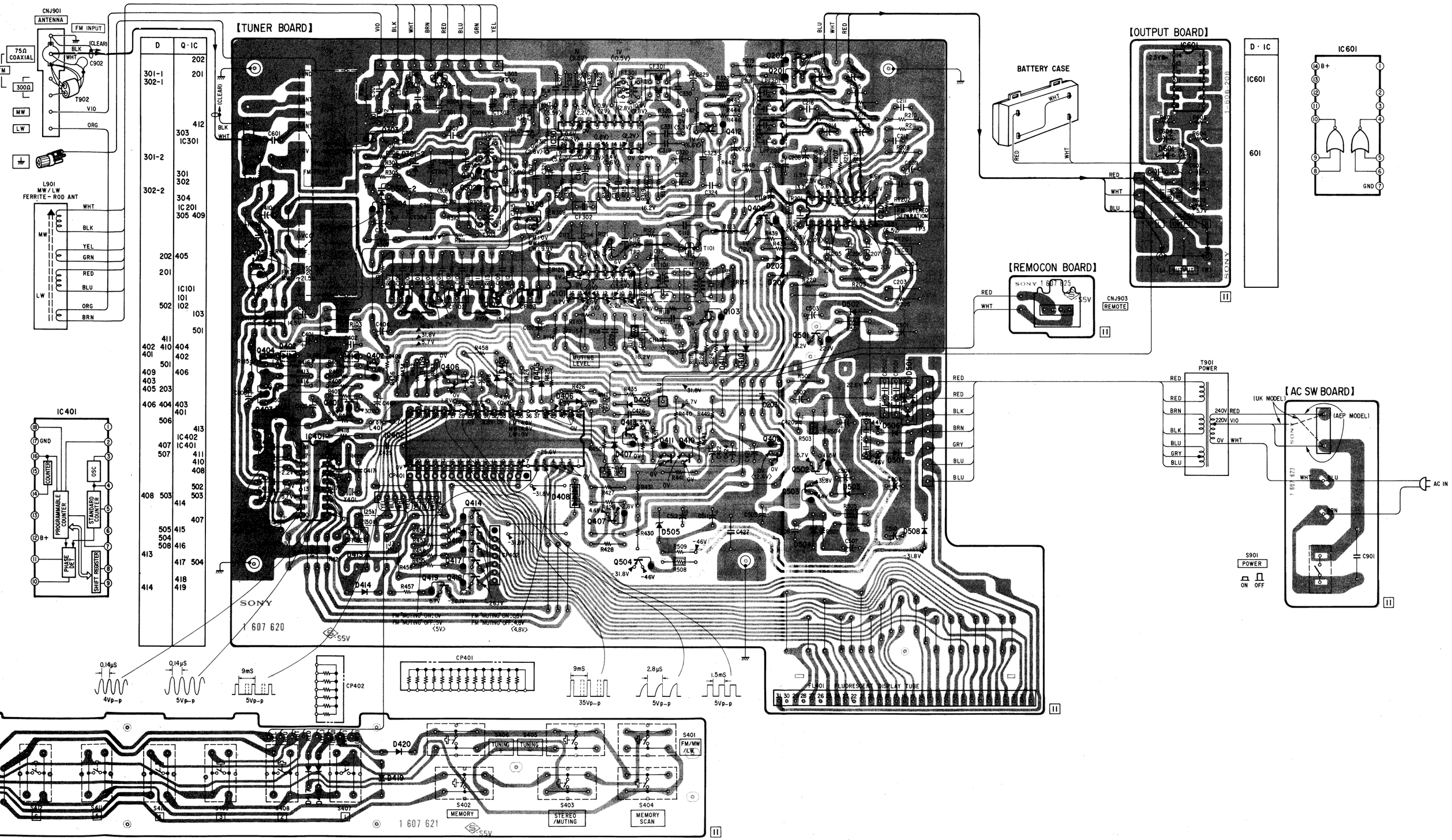


501 and later.
601 and later.
001 and later.

AEP-W. Germany model: Serial No. 506501 and later.
AEP model: Serial No. 505601 and later.
UK model: Serial No. 603001 and later.

ST-JX44L ST-JX44L

C D E F G H I J K



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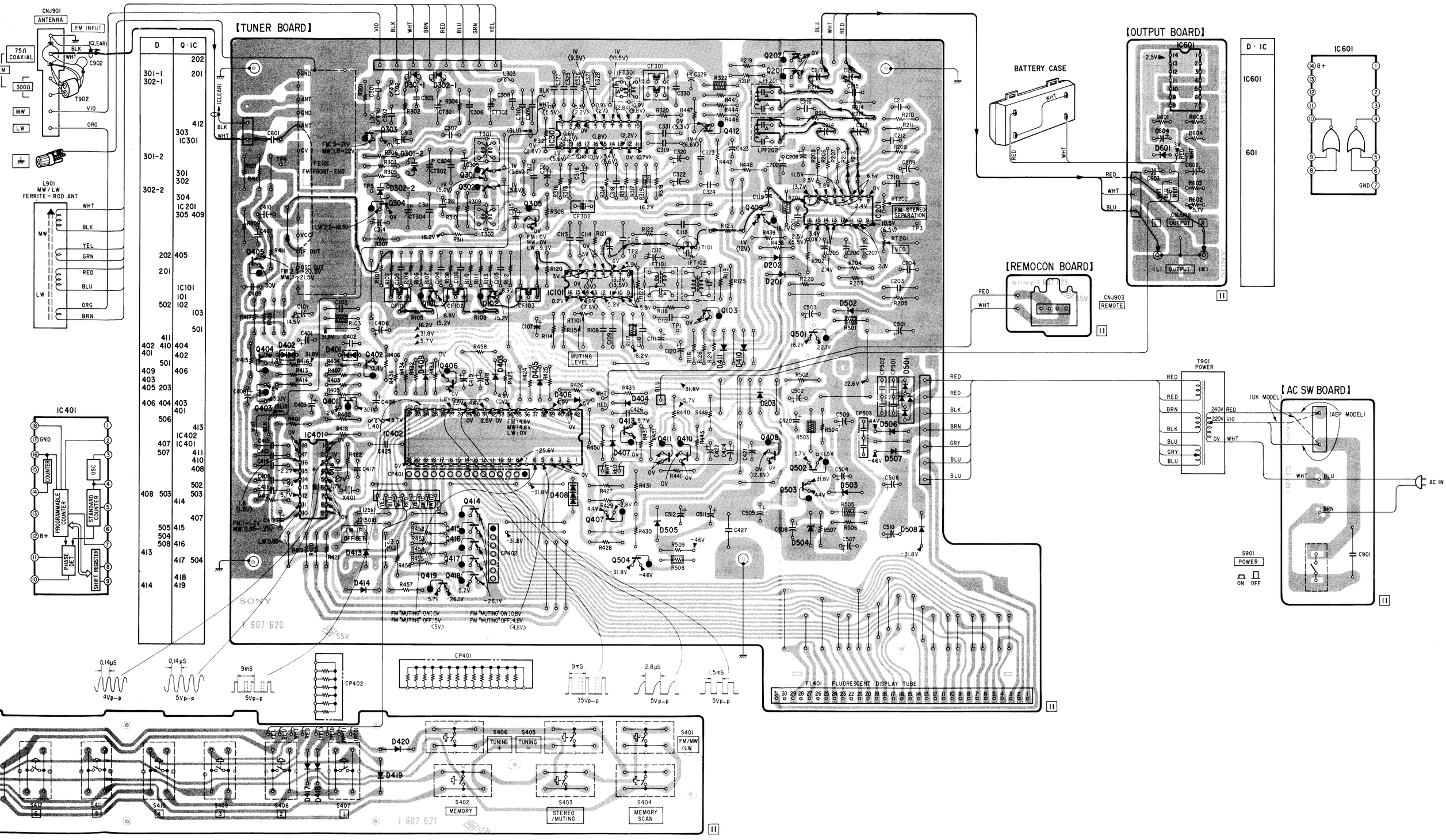
C D E F G H I J K



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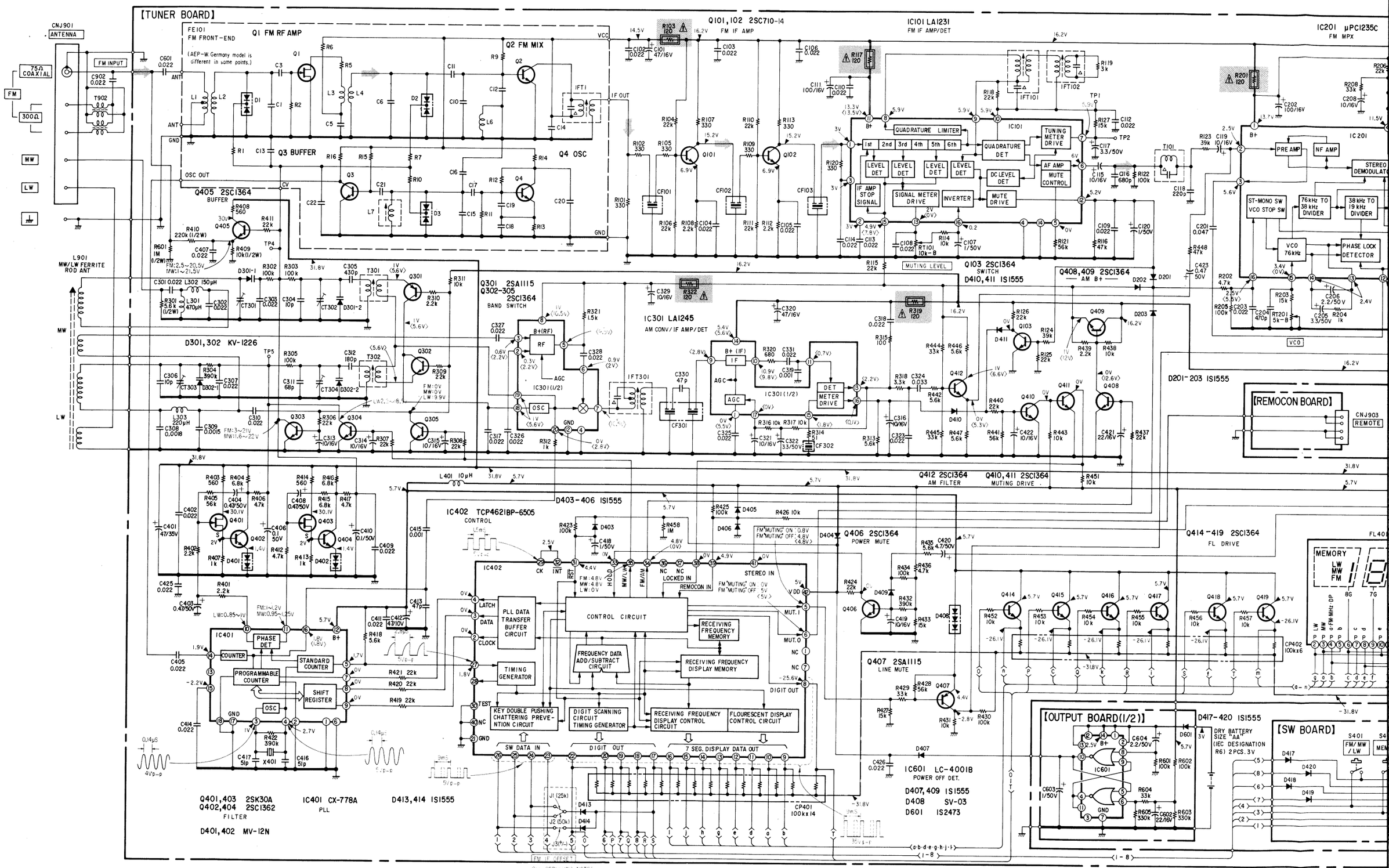
UK model: Serial No. 603001 and later.

ST-JX44L ST-JX44L



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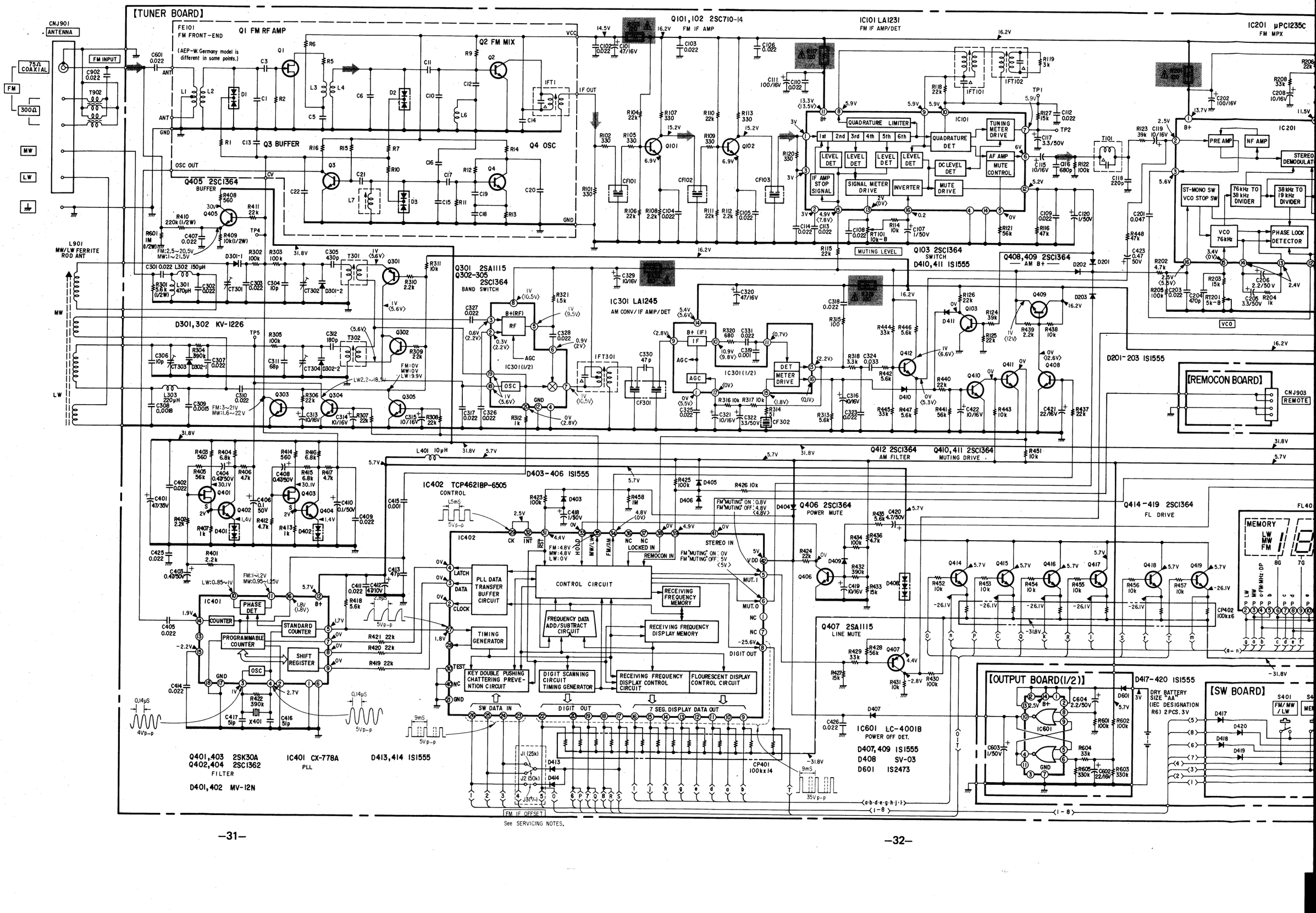
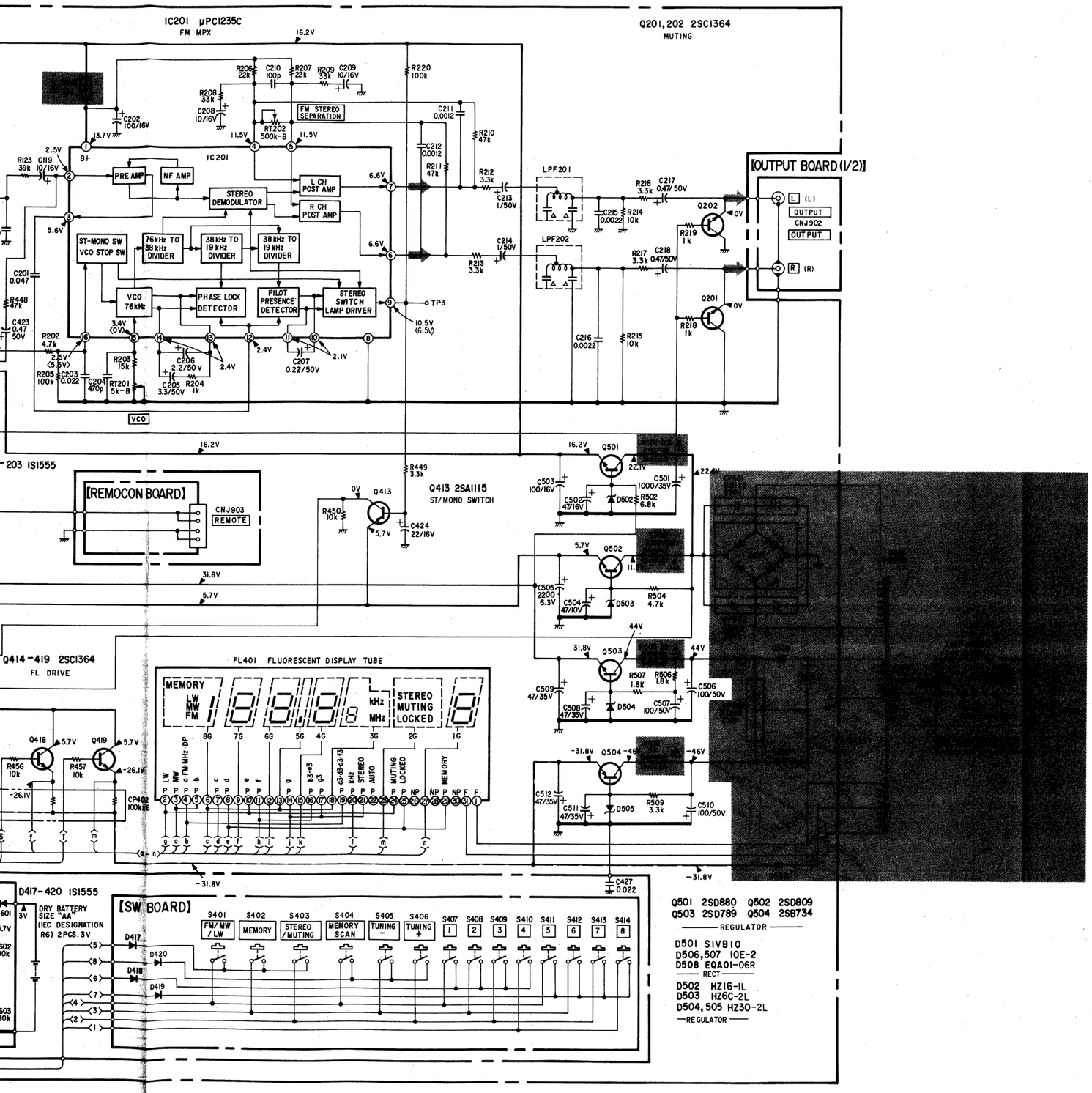
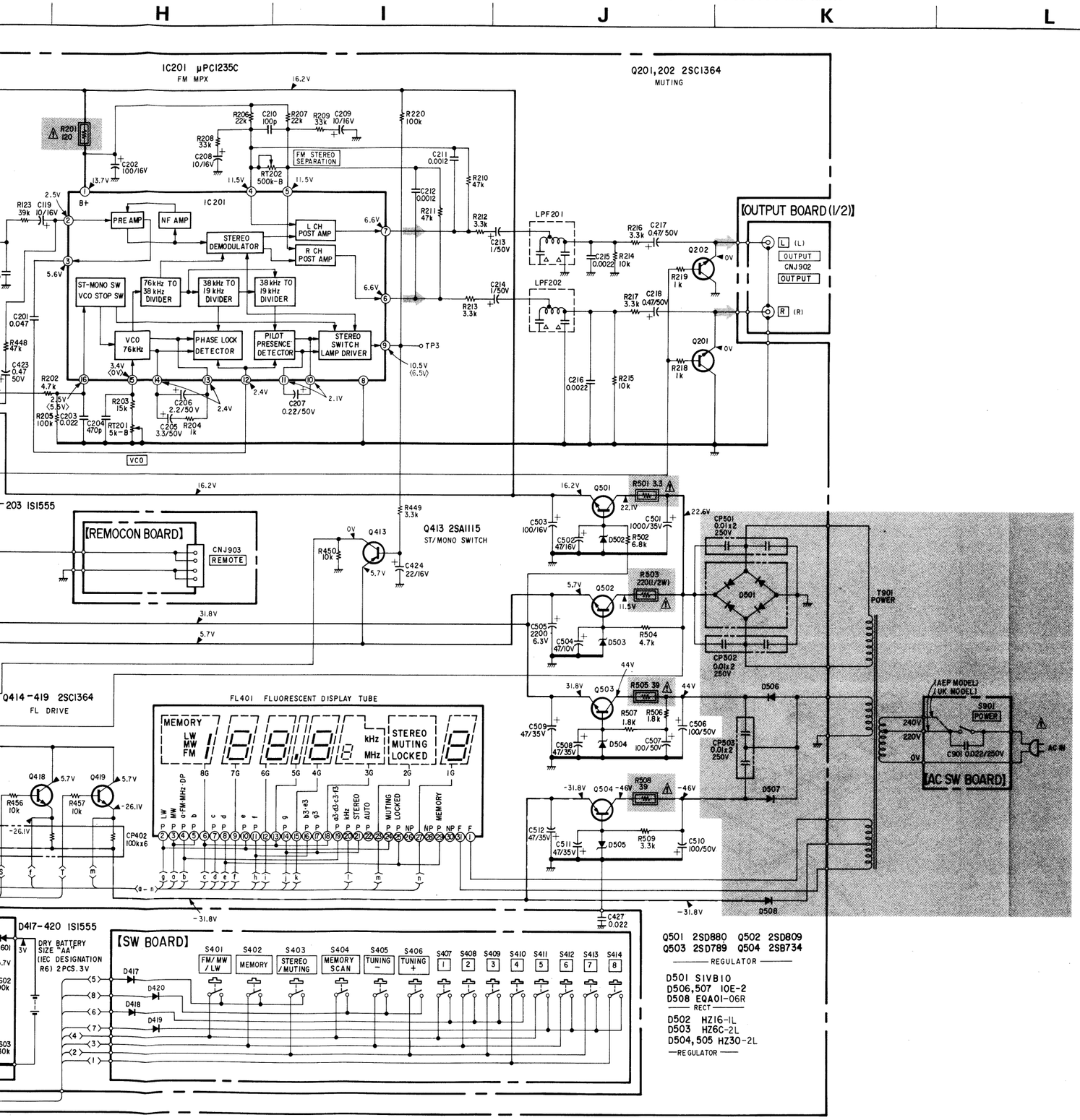
ST-JX44L ST-JX44L





- All capacitors are in μF unless otherwise noted. pF : μμF 50WV or less are not indicated except for electrolytics and tantalums.
- All resistors are in ohms, ¼W unless otherwise noted. kΩ : 1000Ω, MΩ : 1000kΩ
- : nonflammable resistor.
- △ : internal component.
- : panel designation.
- : adjustment for repair.
- ——: B+ bus.
- – – –: B– bus.
- Voltages are dc with respect to ground unless otherwise noted.
- Readings are taken under no-signal (detuned) conditions with a VOM (50 kΩ/V).
  NO MARK : FM
  < > : AM (MW/LW)
- Voltage variations may be noted due to normal production tolerances.
- Signal path

Note: The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.



Q501 2SD880 Q502 2SD809
Q503 2SD789 Q504 2SB734
— REGULATOR —

D501 S1VB10
D506,507 10E-2
D508 EQA01-06R
— RECT —
D502 HZ16-1L
D503 HZ6C-2L
D504,505 HZ30-2L
— REGULATOR —

- All capacitors are in μF unless otherwise noted. pF : μμF 50WV or less are not indicated except for electrolytics and tantalums.
- All resistors are in ohms, ¼ W unless otherwise noted. kΩ : 1000 Ω, MΩ : 1000 kΩ
- : nonflammable resistor.
- △ : internal component.
- : panel designation.
- : adjustment for repair.
- ——— : B+ bus.
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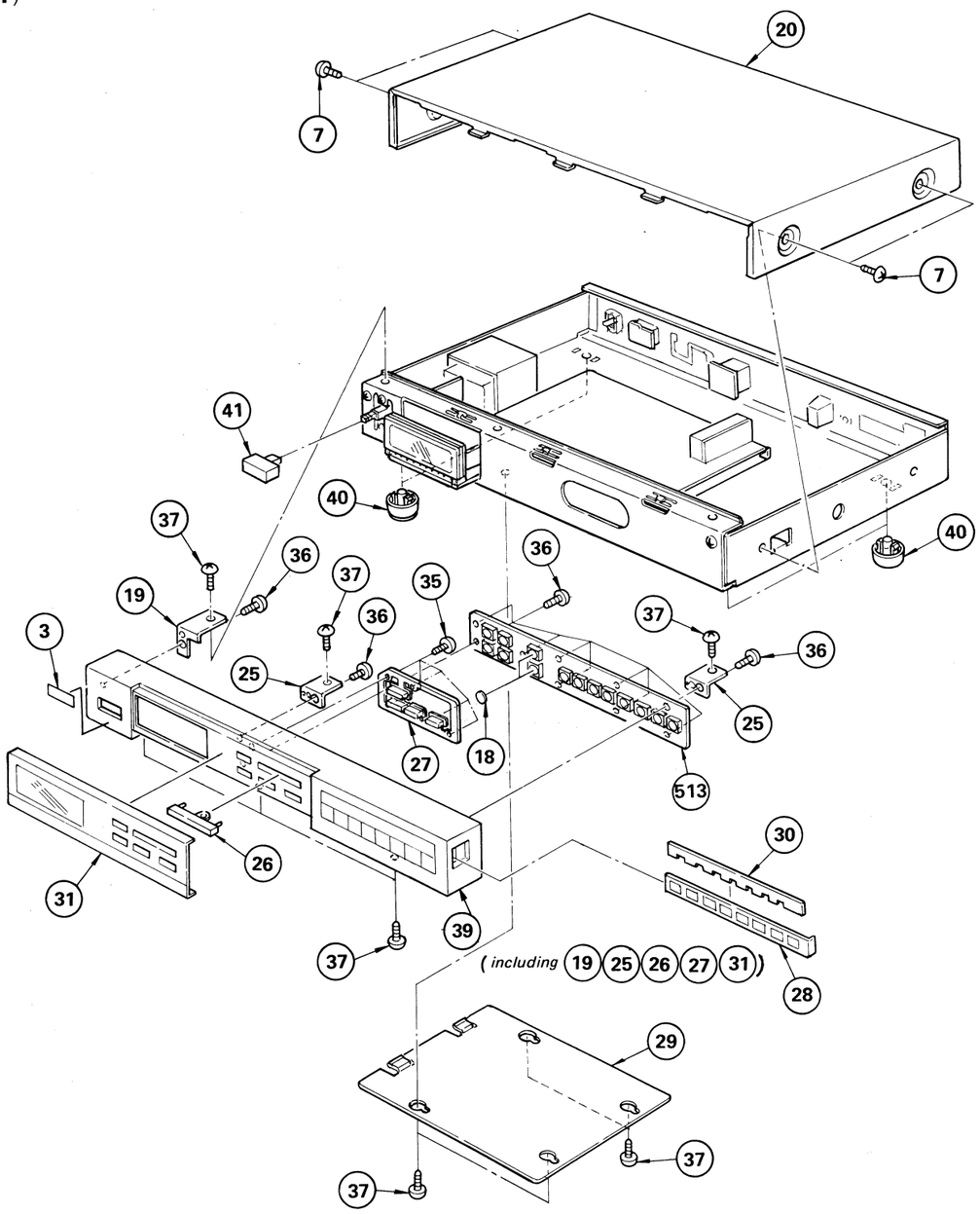
- Voltages are dc with respect to ground unless otherwise noted.
- Readings are taken under no-signal (detuned) conditions with a VOM (50 kΩ/V).
  NO MARK : FM
  < > : AM (MW/LW)
- Voltage variations may be noted due to normal production tolerances.
- Signal path

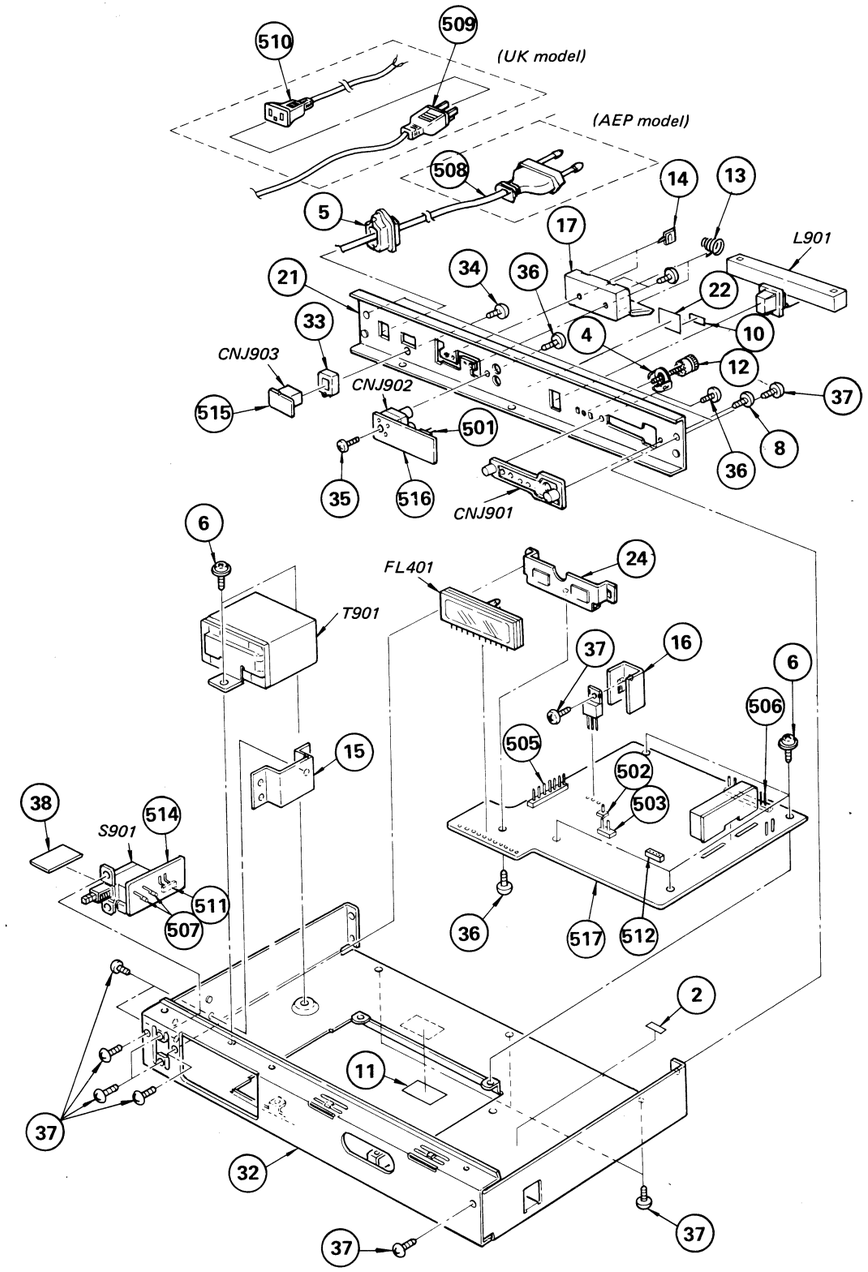
Note: The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

SECTION 5
EXPLODED VIEWS AND PARTS LIST

(1)



(2)



No.	Part
1	.....
2	3-701
3	3-701
4	3-701
5 ⚠	3-703
6	3-703
7	3-703
8	3-703
9	.....
10	3-703
11	3-703
12	3-706
13	3-883
14	3-883
15 ♦	4-866
16 ♦	4-875
17	4-875
18	4-879
19 ♦	4-881
20	4-881
21 ♦	4-881
22	4-881
22	4-881
23	.....
24 ♦	4-881
25 ♦	4-881
26	4-881
27	4-881
28	4-881
29 ♦	4-881
30	4-881
31	4-881
32 ♦	4-881
33	4-882
34	7-685
35	7-685
36	7-685
37	7-685
38	9-911
39	A-432
40	X-370
41	X-487

NOTE:
- Items with no pa
  cription are not
  are seldom requi
- Items marked "
  they are seldom
  service. Some
  pated when orde
- Due to standardi
  numbers (Δ-ΔΔΔ-
  may be differen
  set.

D

GENERAL SECTION

No.	Part No.	Description
1	.....	
2	3-701-030-00	LABEL, SERIAL NUMBER
3	3-701-690-00	(UK)....LABEL (MADE IN JAPAN)
4	3-701-993-00	SPACER, TERMINAL
5 ⚠	3-703-244-00	BUSHING, CORD
6	3-703-249-01	SCREW, S TIGHT, +PTTWH 3X6
7	3-703-354-11	SCREW (OS), CASE, CLAW
8	3-703-473-00	SCREW, TERMINAL
9	.....	
10	3-703-590-00	(AEP-W.Garmany)...LABEL, (SMALL), FTZ
11	3-703-619-00	(UK)....LABEL, MAIN CAUTION
12	3-706-165-00	SCREW
13	3-883-424-00	SPRING
14	3-883-428-00	PLATE, TERMINAL (POSITIVE)
15 ♦	4-866-710-02	TABLE, TRANSFORMER
16 ♦	4-875-327-01	HEAT SINK
17	4-875-530-00	CASE, BATTERY
18	4-879-274-41	SPACER
19 ♦	4-881-516-00	BRACKET (LEFT), PANEL
20	4-881-528-00	CASE
21 ♦	4-881-801-21	PLATE, JACK
22	4-881-809-00	(UK)....LABEL, MODEL NUMBER (UK)
22	4-881-812-00	(AEP)...LABEL, MODEL NUMBER (AEP)
23	.....	
24 ♦	4-881-816-00	BRACKET, INDICATOR TUBE
25 ♦	4-881-817-00	BRACKET, PANEL
26	4-881-819-00	KNOB, TUNING
27	4-881-820-00	KEY, FUNCTION
28	4-881-822-00	HOLDER, INDICATION PLATE
29 ♦	4-881-823-00	PLATE, BOTTOM
30	4-881-825-00	LABEL (E), INDICATOR
31	4-881-827-01	PLATE, TRANSPARENT
32 ♦	4-881-829-01	CHASSIS
33	4-882-034-00	SPACER, TERMINAL, 2 GANG
34	7-685-133-11	SCREW +P 2.6X6 TYPE1
35	7-685-145-11	SCREW +P 3X6 TYPE2 NON-SLIT
36	7-685-646-11	SCREW +BVTP 3X8 TYPE2 N-S
37	7-685-871-01	SCREW +BVTT 3X6 (S)
38	9-911-863-XX	INSULATOR
39	A-4322-447-A	PANEL ASSY
40	X-3701-069-0	FOOT ASSY, M.F
41	X-4875-108-0	KNOB ASSY, POWER

ACCESSORY & PACKING MATERIAL

No.	Part No.	Description
81	1-501-161-00	ANTENNA,FEEDER
82	1-528-027-11	BATTERY, NEW SUPER (SUM-3)(NS)
83	1-551-734-11	CORD, CONNECTION
84	3-701-630-00	BAG, POLYETHYLENE
85	3-783-960-11	MANUAL, INSTRUCTION
86	3-783-960-41	(AEP)....MANUAL, INSTRUCTION
87	4-881-806-00	LABEL (EP), INDICATOR
88	3-703-540-00	(AEP-W.Germany)...INSTRUCTION, FTZ
89	4-876-352-00	SHEET, PROTECTION
90	4-881-536-00	CUSHION, UPPER
91	4-881-537-00	CUSHION, LOWER
92	4-881-838-00	INDIVIDUAL CARTON

ELECTRICAL PARTS

Ref.No.	Part No.	Description		
501 ♦	1-508-800-13	U TYPE BASE POST 3P		
502 ♦	1-535-114-00	TERMINAL		
503 ♦	1-535-115-00	TERMINAL		
504	.....			
505 ♦	1-535-120-00	TERMINAL		
506 ♦	1-535-121-00	TERMINAL		
507 ♦	1-535-416-00	TERMINAL		
508 ⚠	1-551-427-11	(AEP)...CORD, POWER, EULO PLUG		
509 ⚠	1-551-962-00	(UK)....CORD, POWER		
510 ⚠	1-551-967-00	(UK)....CORD, POWER		
511 ♦	1-560-595-00	TERMINAL (WITH BASE)		
512 ♦	1-560-709-00	PIN, CONNECTOR 8P		
513 ♦	1-607-621-00	PC BOARD, SW		
514 ⚠♦	1-607-623-00	PC BOARD, AC SW		
515 ♦	1-607-625-00	PC BOARD, REMOTE CONTROL		
516 ♦	1-608-208-00	PC BOARD, OUTPUT		
517	A-4351-310-A	MOUNTED PCB, TUNER		
C204	1-103-717-11	POLYSTYRENE	470PF	5% 50V
C305	1-103-716-00	POLYSTYRENE	430PF	5% 50V
C312	1-103-707-00	POLYSTYRENE	180PF	5% 50V
C416	1-102-522-00	CERAMIC	51PF	5% 50V
C417	1-102-522-00	CERAMIC	51PF	5% 50V
C901 ⚠	1-130-456-00	FILM	0.022MF	20% 250V
CF101	1-527-968-00	FILTER, CERAMIC		
CF102	1-527-968-00	FILTER, CERAMIC		
CF103	1-527-968-00	FILTER, CERAMIC		
CF301	1-527-937-00	FILTER, CERAMIC		
CF302	1-527-981-00	FILTER, CERAMIC		
CNJ901	1-536-666-21	TERMINAL BOARD (ANTENNA)		
CNJ902	1-507-731-00	JACK, PIN 2P		
♦ CNJ903	1-560-039-00	PIN, CONNECTOR		
CP401	1-232-316-00	COMPOSITION CIRCUIT BLOCK		
CP402	1-231-849-00	COMPOSITION CIRCUIT BLOCK		
CP501 ⚠	1-102-394-00	CERAMIC	0.01MFX2	250V
CP502 ⚠	1-102-394-00	CERAMIC	0.01MFX2	250V
CP503 ⚠	1-102-394-00	CERAMIC	0.01MFX2	250V
CT301	1-141-180-00	CAP, TRIMMER		
CT302	1-141-171-00	CAP, TRIMMER		
CT303	1-141-171-00	CAP, TRIMMER		
CT304	1-141-171-00	CAP, TRIMMER		
D201	8-719-815-55	DIODE 1S1555		
D202	8-719-815-55	DIODE 1S1555		
D203	8-719-815-55	DIODE 1S1555		
D301	8-719-912-27	DIODE KV1226		
D302	8-719-912-27	DIODE KV1226		
D401	8-719-912-00	DIODE MV-12N		

ELECTRICAL PARTS

Ref.No.	Part No.	Description
D402	8-719-912-00	DIODE MV-12N
D403	8-719-815-55	DIODE 1S1555
D404	8-719-815-55	DIODE 1S1555
D405	8-719-815-55	DIODE 1S1555
D406	8-719-815-55	DIODE 1S1555
D407	8-719-815-55	DIODE 1S1555
D408	8-719-300-03	DIODE SV-03
D409	8-719-815-55	DIODE 1S1555
D410	8-719-815-55	DIODE 1S1555
D411	8-719-815-55	DIODE 1S1555
D413	8-719-815-55	DIODE 1S1555
D414	8-719-815-55	DIODE 1S1555
D417	8-719-815-55	DIODE 1S1555
D418	8-719-815-55	DIODE 1S1555
D419	8-719-815-55	DIODE 1S1555
D420	8-719-815-55	DIODE 1S1555
D501 ⚠	8-719-511-20	DIODE S1VB20
D502	8-719-901-61	DIODE HZ16-1L
D503	8-719-910-68	DIODE HZ6C2L
D504	8-719-913-02	DIODE HZ30-2L
D505	8-719-913-02	DIODE HZ30-2L
D506 ⚠	8-719-200-02	DIODE 10E-2
D507 ⚠	8-719-200-02	DIODE 10E-2
D508 ⚠	8-719-936-06	DIODE EQA01-06R
D601	8-719-815-55	DIODE 1S1555
FE101 ♦	A-4344-029-A	FM FRONT-END (FEE-004W)···UK, AEP-except W.Germany
♦	A-4344-031-A	FM FRONT-END(FEE-004G)···AEP-W.Germany
FL401	1-519-264-00	INDICATOR TUBE, FLUORESCENT
IC101	8-759-812-31	IC LA1231
IC201	8-759-112-35	IC UPC1235C
IC301	8-759-812-45	IC LA1245
IC701	8-759-140-11	IC μPD4011BC
IC401	8-759-617-78	IC CX-778A
IC402	8-759-201-26	IC TCP4621BP6505
IC601	8-759-800-01	IC LC4001B
IFT101	1-404-400-00	TRANSFORMER, DISCRIMINATOR
IFT102	1-404-401-00	TRANSFORMER, DISCRIMINATOR
IFT301	1-404-413-00	TRANSFORMER, IF
L301	1-407-177-XX	MICRO INDUCTOR 470UH
L302	1-407-171-XX	MICRO INDUCTOR 150UH
L303	1-407-173-XX	MICRO INDUCTOR 220UH
L401	1-407-157-XX	MICRO INDUCTOR 10UH
L901	1-401-990-00	ANTENNA, FERRITE-ROD (LW/MW)
LPF201	1-235-138-00	FILTER, LOW PASS
LPF202	1-235-138-00	FILTER, LOW PASS

NOTE:
- Items with no part number and no description are not stocked because they are seldom required for routine service.
- Items marked " ♦ " are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- Due to standardization, parts with part numbers (Δ-ΔΔΔ-ΔΔΔ-XX or Δ-ΔΔΔΔ-ΔΔΔ-X) may be different from those used in the set.

CAPACITORS:
- All capacitors are in μF. Common capacitors are omitted. Refer to the following lists for their part numbers. MF:μF, PF:μμF.

RESISTORS
- All resistors are in ohms. Common 1/4W, 1/8W and 1/16W carbon resistors are omitted. Refer to the following lists for their part numbers.
- F : nonflammable

COILS
- MMH : mH, UH : μH

The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

Les composants identifiés par une trame et une marque ⚠ sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.

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ELECTRICAL PARTS

Ref.No.	Part No.	Description
Q101	8-729-671-14	TRANSISTOR 2SC710-14
Q102	8-729-671-14	TRANSISTOR 2SC710-14
Q103	8-729-663-47	TRANSISTOR 2SC1364
Q201	8-729-663-47	TRANSISTOR 2SC1364
Q202	8-729-663-47	TRANSISTOR 2SC1364
Q301	8-729-612-77	TRANSISTOR 2SA1027R
Q302	8-729-663-47	TRANSISTOR 2SC1364
Q303	8-729-663-47	TRANSISTOR 2SC1364
Q304	8-729-663-47	TRANSISTOR 2SC1364
Q305	8-729-663-47	TRANSISTOR 2SC1364
Q401	8-729-203-05	TRANSISTOR 2SK30A-GR3
Q402	8-729-665-48	TRANSISTOR 2SC1362
Q403	8-729-203-05	TRANSISTOR 2SK30A-GR3
Q404	8-729-665-47	TRANSISTOR 2SC1362
Q405	8-729-663-47	TRANSISTOR 2SC1364
Q406	8-729-663-47	TRANSISTOR 2SC1364
Q407	8-729-612-77	TRANSISTOR 2SA1027R
Q408	8-729-663-47	TRANSISTOR 2SC1364
Q409	8-729-663-47	TRANSISTOR 2SC1364
Q410	8-729-663-47	TRANSISTOR 2SC1364
Q411	8-729-663-47	TRANSISTOR 2SC1364
Q412	8-729-663-47	TRANSISTOR 2SC1364
Q413	8-729-612-77	TRANSISTOR 2SA1027R
Q414	8-729-663-47	TRANSISTOR 2SC1364
Q415	8-729-663-47	TRANSISTOR 2SC1364
Q416	8-729-663-47	TRANSISTOR 2SC1364
Q417	8-729-663-47	TRANSISTOR 2SC1364
Q418	8-729-663-47	TRANSISTOR 2SC1364
Q419	8-729-663-47	TRANSISTOR 2SC1364
Q501	8-729-288-02	TRANSISTOR 2SD880
Q502	8-729-180-93	TRANSISTOR 2SD809
Q503	8-729-177-43	TRANSISTOR 2SD774
Q504	8-729-374-02	TRANSISTOR 2SB734
Q701	8-729-663-47	TRANSISTOR 2SC1364
Q702	8-729-201-52	TRANSISTOR 2SA1015
Q703	8-729-201-52	TRANSISTOR 2SA1015
R103 ⚠	1-247-109-00	CARBON 120 5% 1/4W F
R117 ⚠	1-247-109-00	CARBON 120 5% 1/4W F
R201 ⚠	1-247-109-00	CARBON 120 5% 1/4W F
R319 ⚠	1-247-109-00	CARBON 120 5% 1/4W F
R322 ⚠	1-247-109-00	CARBON 120 5% 1/4W F
R501 ⚠	1-247-077-00	CARBON 3.3 5% 1/4W F
R503 ⚠	1-247-224-00	CARBON 220 5% 1/2W F
R505 ⚠	1-247-097-00	CARBON 39 5% 1/4W F
R508 ⚠	1-247-097-00	CARBON 39 5% 1/4W F

ELECTRICAL PARTS

Ref.No.	Part No.	Description
RT101	1-228-505-00	RES, ADJ, METAL GLAZE 10K
RT201	1-228-160-11	RES, ADJ, METAL GLAZE 5K
RT202	1-228-743-00	RES, ADJ, METAL GLAZE 500K
S401	1-552-539-00	SWITCH, KEY BOARD
S402	1-552-539-00	SWITCH, KEY BOARD
S403	1-552-539-00	SWITCH, KEY BOARD
S404	1-552-539-00	SWITCH, KEY BOARD
S405	1-552-539-00	SWITCH, KEY BOARD
S406	1-552-539-00	SWITCH, KEY BOARD
S407	1-552-539-00	SWITCH, KEY BOARD
S408	1-552-539-00	SWITCH, KEY BOARD
S409	1-552-539-00	SWITCH, KEY BOARD
S410	1-552-539-00	SWITCH, KEY BOARD
S411	1-552-539-00	SWITCH, KEY BOARD
S412	1-552-539-00	SWITCH, KEY BOARD
S413	1-552-539-00	SWITCH, KEY BOARD
S414	1-552-539-00	SWITCH, KEY BOARD
S901 ⚠	1-553-318-00	SWITCH, PUSH (AC POWER)
T101	1-235-126-00	ENCAPSULATED COMPONENT
T301	1-405-927-00	COIL, MW OSC
T302	1-405-914-00	COIL, LW OSC
T901 ⚠	1-447-344-00	TRANSFORMER, POWER
X401	1-527-731-00	OSCILLATOR, CRYSTAL

NOTE:
- Items with no part number and no description are not stocked because they are seldom required for routine service.
- Items marked " ♦ " are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- Due to standardization, parts with part numbers (Δ-ΔΔΔ-ΔΔΔ-XX or Δ-ΔΔΔΔ-ΔΔΔ-X) may be different from those used in the set.

CAPACITORS:
- All capacitors are in μF. Common capacitors are omitted. Refer to the following lists for their part numbers. MF:μF, PF:μμF.

RESISTORS
- All resistors are in ohms. Common 1/4W, 1/8W and 1/16W carbon resistors are omitted. Refer to the following lists for their part numbers.
- F : nonflammable

COILS
- MMH : mH, UH : μH

The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

Les composants identifiés par une trame et une marque ⚠ sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.

ELECTROLYTIC CAPACITORS

CAP. (μF)	RATING → : Use the high voltage rated one.					
	6.3 VOLT.	10 VOLT.	16 VOLT.	25 VOLT.	35 VOLT.	50 VOLT.
	PART No.	PART No.	PART No.	PART No.	PART No.	PART No.
0.47					→	1-121-726-00
1.0					→	1-121-391-00
2.2					→	1-121-450-00
3.3	→	→	→	1-121-392-00	→	1-121-393-00
4.7	→	→	→	1-121-395-00	→	1-121-396-00
10	→	→	1-121-651-00	1-121-398-00	→	1-121-738-00
22	→	→	1-121-479-00	1-121-480-00	1-121-662-00	1-121-152-00
33	→	→	1-121-403-00	1-121-404-00	1-121-652-00	1-121-405-00
47	→	1-121-352-00	1-121-409-00	1-121-410-00	1-121-653-00	1-121-411-00
100	→	1-121-414-00	1-121-415-00	1-121-416-00	1-121-357-00	1-121-417-00
220	1-121-419-00	1-121-420-00	1-121-421-00	1-121-422-00	1-121-261-00	1-121-423-00
330	1-121-751-00	1-121-805-00	1-121-521-00	1-121-654-00	1-121-655-00	1-121-656-00
470	1-121-424-00	1-121-425-00	1-121-426-00	1-121-733-00	1-121-361-00	1-121-810-00
1000	–	1-121-736-00	1-121-245-00	1-121-657-00	1-121-388-00	1-123-061-00
2200	1-121-658-00	1-121-659-00	1-121-660-00	1-123-067-00	1-121-984-00	–
3300	1-121-661-00	1-123-075-00	1-123-071-00	–	–	–

CAP. (μF)	100 VOLT.	160 VOLT.	250 VOLT.	350 VOLT.
	PART No.	PART No.	PART No.	PART No.
0.47	–	–	–	–
1.0	1-123-249-00	1-123-252-00	1-123-003-00	1-121-168-00
2.2	1-123-250-00	1-123-026-00	–	1-123-028-00
3.3	1-121-995-00	–	1-123-004-00	1-123-006-00
4.7	1-123-255-00	1-121-246-00	1-121-759-00	1-123-007-00
10	1-121-126-00	1-121-999-00	1-123-254-00	1-123-008-00
22	1-121-996-00	1-123-253-00	1-123-005-00	1-123-022-00
33	1-121-997-00	1-121-757-00	–	–
47	1-123-251-00	1-121-919-00	–	–
100	1-123-084-00	–	–	–

CERAMIC CAPACITORS

CAP. (pF)	RATING							
	50 VOLT.	CAP. (pF)	50 VOLT.	CAP. (pF)	50 VOLT.	CAP. (μF)	50 VOLT.
	PART No.		PART No.		PART No.		PART No.
0.5	1-101-837-00	22	1-102-959-00	150	1-101-361-00	0.001	1-102-074-00
0.75	1-101-586-00	24	1-102-960-00	160	1-101-367-00	0.0012	1-102-118-00
1.0	1-102-934-00	27	1-102-961-00	180	1-102-976-00	0.0015	1-102-119-00
1.5	1-101-576-00	30	1-102-962-00	200	1-102-977-00	0.0018	1-102-120-00
2.0	1-102-935-00	33	1-102-963-00	220	1-102-978-00	0.0022	1-102-121-00
3	1-102-936-00	36	1-102-964-00	240	1-102-979-00	0.0027	1-102-122-00
4	1-102-937-00	39	1-102-965-00	270	1-102-980-00	0.0033	1-102-123-00
5	1-102-942-00	43	1-102-966-00	300	1-102-981-00	0.0039	1-102-124-00
6	1-102-943-00	47	1-101-880-00	330	1-102-820-00	0.0047	1-102-125-00
7	1-102-944-00	51	1-101-882-00	360	1-102-821-00	0.0056	1-102-126-00
8	1-102-945-00	56	1-101-884-00	390	1-102-822-00	0.0068	1-102-127-00
9	1-102-946-00	62	1-101-886-00	430	1-102-823-00	0.0082	1-102-128-00
10	1-102-947-00	68	1-101-888-00	470	1-102-824-00	0.01	1-102-129-00
11	1-102-948-00	75	1-101-890-00	510	1-101-059-00	0.022	1-101-005-00
12	1-102-949-00	82	1-102-971-00	560	1-102-115-00	0.047	1-101-006-00
13	1-102-950-00	91	1-102-972-00	680	1-102-116-00		
15	1-102-951-00	100	1-102-973-00	820	1-102-117-00		
16	1-102-952-00	110	1-102-815-00				
18	1-102-953-00	120	1-102-816-00				
20	1-102-958-00	130	1-101-081-00				

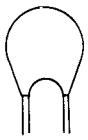
0.001μF = 1,000pF

CERAMIC (SEMICONDUCTOR) CAPACITORS

CAP. (μF)	RATING → : Use the high voltage rated one.				
	25 VOLT.	50 VOLT.	CAP. (μF)	25 VOLT.	50 VOLT.
	PART No.	PART No.		PART No.	PART No.
0.001	→	1-161-039-00	0.018	1-161-016-00	1-161-054-00
0.0012	→	1-161-040-00	0.022	1-161-017-00	1-161-055-00
0.0015		1-161-041-00	0.027	1-161-018-00	1-161-056-00
0.0018		1-161-042-00	0.033	1-161-019-00	1-161-057-00
0.0022		1-161-043-00	0.039	1-161-010-00	1-161-058-00
0.0027	→	1-161-044-00	0.047	1-161-021-00	1-161-059-00
0.0033	→	1-161-045-00	0.056	→	1-161-060-00
0.0039	→	1-161-046-00	0.068	→	1-161-061-00
0.0047	→	1-161-047-00	0.082	1-161-024-00	1-161-062-00
0.0056	→	1-161-048-00	0.1	1-161-025-00	1-161-063-00
0.0068	→	1-161-049-00			
0.0082	1-161-012-00	1-161-050-00			
0.01	1-161-013-00	1-161-051-00			
0.012	→	1-161-052-00			
0.015	1-161-015-00	1-161-053-00			

MYLAR CAPACITORS

CAP. (μF)	RATING 50 VOLT. PART No.	100 VOLT. PART No.	200 VOLT. PART No.	CAP. (μF)	50 VOLT. PART No.	100 VOLT. PART No.	200 VOLT. PART No.	CAP. (μF)	50 VOLT. PART No.	100 VOLT. PART No.	200 VOLT. PART No.
0.001	1-108-227-00	1-108-365-00	1-108-409-00	0.01	1-108-239-00	1-108-377-00	1-108-421-00	0.1	1-108-251-00	1-108-389-00	1-108-433-00
0.0012	1-108-351-00	1-108-366-00	1-108-410-00	0.012	1-108-357-00	1-108-378-00	1-108-422-00	0.12	1-108-363-00	1-108-390-00	1-108-434-00
0.0015	1-108-228-00	1-108-367-00	1-108-411-00	0.015	1-108-240-00	1-108-379-00	1-108-423-00	0.15	1-108-252-00	1-108-391-00	1-108-435-00
0.0018	1-108-352-00	1-108-368-00	1-108-412-00	0.018	1-108-358-00	1-108-380-00	1-108-424-00	0.18	1-108-364-00	1-108-392-00	1-108-436-00
0.0022	1-108-220-00	1-108-369-00	1-108-413-00	0.022	1-108-242-00	1-108-381-00	1-108-425-00	0.22	1-108-254-00	1-108-393-00	1-108-437-00
0.0027	1-108-353-00	1-108-370-00	1-108-414-00	0.027	1-108-359-00	1-108-382-00	1-108-426-00	0.27	1-108-854-00	–	–
0.0033	1-108-232-00	1-108-371-00	1-108-415-00	0.033	1-108-244-00	1-108-383-00	1-108-427-00	0.33	1-108-855-00	–	–
0.0039	1-108-354-00	1-108-372-00	1-108-416-00	0.039	1-108-360-00	1-108-384-00	1-108-428-00	0.39	1-108-856-00	–	–
0.0047	1-108-234-00	1-108-373-00	1-108-417-00	0.047	1-108-246-00	1-108-385-00	1-108-429-00	0.47	1-108-857-00	–	–
0.0056	1-108-355-00	1-108-374-00	1-108-418-00	0.056	1-108-361-00	1-108-386-00	1-108-430-00				
0.0068	1-108-237-00	1-108-375-00	1-108-419-00	0.068	1-108-249-00	1-108-387-00	1-108-431-00				
0.0082	1-108-356-00	1-108-376-00	1-108-420-00	0.082	1-108-362-00	1-108-388-00	1-108-432-00				

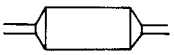


TANTALUM CAPACITORS

→: Use the high voltage rated one.

CAP. (μF)	RATING 3.15 VOLT. PART No.	6.3 VOLT. PART No.	10 VOLT. PART No.	16 VOLT. PART No.	20 VOLT. PART No.	25 VOLT. PART No.	35 VOLT. PART No.
0.01					→	→	1-131-396-00
0.015						→	1-131-397-00
0.022						→	1-131-398-00
0.033						→	1-131-399-00
0.047						→	1-131-400-00
0.068					→	→	1-131-401-00
0.1					→	→	1-131-402-00
0.15					→	→	1-131-403-00
0.22					→	→	1-131-404-00
0.33					→	1-131-409-00	1-131-405-00
0.47	–	–	–	–	1-131-412-00	→	1-131-406-00
0.68	–	–	–	1-131-415-00	→	1-131-410-00	1-131-407-00
1.0	–	–	1-131-418-00	–	1-131-413-00	→	1-131-408-00
1.5	–	1-131-421-00	–	1-131-416-00	→	1-131-411-00	1-131-348-00
2.2	1-131-424-00	–	1-131-419-00	–	1-131-414-00	1-131-355-00	1-131-349-00
3.3	–	1-131-422-00	–	1-131-417-00	1-131-362-00	1-131-356-00	1-131-350-00
4.7	1-131-425-00	–	1-131-420-00	1-131-369-00	1-131-363-00	1-131-357-00	1-131-351-00
6.8	–	1-131-423-00	1-131-376-00	1-131-370-00	1-131-364-00	1-131-358-00	1-131-352-00
10	1-131-426-00	1-131-383-00	1-131-377-00	1-131-371-00	1-131-365-00	1-131-359-00	1-131-353-00
15	1-131-390-00	1-131-384-00	1-131-378-00	1-131-372-00	1-131-366-00	1-131-360-00	–
22	1-131-391-00	1-131-385-00	1-131-379-00	1-131-373-00	1-131-367-00		
33	1-131-392-00	1-131-386-00	1-131-380-00	1-131-374-00			
47	1-131-393-00	1-131-387-00	1-131-381-00	–			
68	1-131-394-00	1-131-388-00	–	–			
100	1-131-395-00	–	–	–			

TANTALUM CAPACITORS



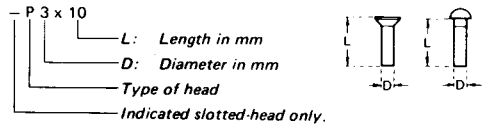
CAP. (μF)	RATING 3 VOLT. PART No.	6.3 VOLT. PART No.	10 VOLT. PART No.	16 VOLT. PART No.	20 VOLT. PART No.	35 VOLT. PART No.
0.033						1-131-273-00
0.047						1-131-274-00
0.068						1-131-275-00
0.1						1-131-276-00
0.15						1-131-277-00
0.22			–	–	1-131-262-00	1-131-278-00
0.33			–	–	1-131-263-00	1-131-279-00
0.47			1-131-169-00	–	1-131-264-00	1-131-280-00
0.68			–	1-131-258-00	1-131-265-00	1-131-281-00
1.0			1-131-254-00	–	1-131-266-00	1-131-282-00
1.5		1-131-250-00	–	–	1-131-267-00	1-131-283-00
2.2		–	–	1-131-259-00	1-131-268-00	1-131-284-00
3.3		–	1-131-255-00	–	1-131-269-00	–
4.7		1-131-251-00	1-131-171-00	–	1-131-270-00	–
6.8		–	–	1-131-260-00	1-131-271-00	–
10	–	–	1-131-256-00	–	1-131-272-00	–
15	–	1-131-252-00	–	1-131-261-00		
22	–	–	1-131-257-00	–		
33	1-131-176-00	1-131-253-00	1-131-173-00	–		
47	1-131-288-00	1-131-174-00	–	–		
100	1-131-177-00					

1/4 WATT CARBON RESISTORS

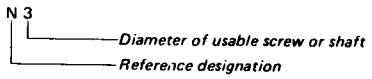
Ω	Part No.	Ω	Part No.	Ω	Part No.	Ω	Part No.	Ω	Part No.	Ω	Part No.	Ω	Part No.
1.0	1-246-401-00	10	1-246-425-00	100	1-246-449-00	1.0k	1-246-473-00	10k	1-246-497-00	100k	1-246-521-00	1.0M	1-246-545-00
1.1	1-246-402-00	11	1-246-426-00	110	1-246-450-00	1.1k	1-246-474-00	11k	1-246-498-00	110k	1-246-522-00	1.1M	1-210-814-00
1.2	1-246-403-00	12	1-246-427-00	120	1-246-451-00	1.2k	1-246-475-00	12k	1-246-499-00	120k	1-246-523-00	1.2M	1-210-815-00
1.3	1-246-404-00	13	1-246-428-00	130	1-246-452-00	1.3k	1-246-476-00	13k	1-246-500-00	130k	1-246-524-00	1.3M	1-210-816-00
1.5	1-246-405-00	15	1-246-429-00	150	1-246-453-00	1.5k	1-246-477-00	15k	1-246-501-00	150k	1-246-525-00	1.5M	1-210-817-00
1.6	1-246-406-00	16	1-246-430-00	160	1-246-454-00	1.6k	1-246-478-00	16k	1-246-502-00	160k	1-246-526-00	1.6M	1-210-818-00
1.8	1-246-407-00	18	1-246-431-00	180	1-246-455-00	1.8k	1-246-479-00	18k	1-246-503-00	180k	1-246-527-00	1.8M	1-210-819-00
2.0	1-246-408-00	20	1-246-432-00	200	1-246-456-00	2.0k	1-246-480-00	20k	1-246-504-00	200k	1-246-528-00	2.0M	1-210-820-00
2.2	1-246-409-00	22	1-246-433-00	220	1-246-457-00	2.2k	1-246-481-00	22k	1-246-505-00	220k	1-246-529-00	2.2M	1-210-821-00
2.4	1-246-410-00	24	1-246-434-00	240	1-246-458-00	2.4k	1-246-482-00	24k	1-246-506-00	240k	1-246-530-00	2.4M	1-244-754-00
2.7	1-246-411-00	27	1-246-435-00	270	1-246-459-00	2.7k	1-246-483-00	27k	1-246-507-00	270k	1-246-531-00	2.7M	1-244-755-00
3.0	1-246-412-00	30	1-246-436-00	300	1-246-460-00	3.0k	1-246-484-00	30k	1-246-508-00	300k	1-246-532-00	3.0M	1-244-756-00
3.3	1-246-413-00	33	1-246-437-00	330	1-246-461-00	3.3k	1-246-485-00	33k	1-246-509-00	330k	1-246-533-00	3.3M	1-244-757-00
3.6	1-246-414-00	36	1-246-438-00	360	1-246-462-00	3.6k	1-246-486-00	36k	1-246-510-00	360k	1-246-534-00	3.6M	1-244-758-00
3.9	1-246-415-00	39	1-246-439-00	390	1-246-463-00	3.9k	1-246-487-00	39k	1-246-511-00	390k	1-246-535-00	3.9M	1-244-759-00
4.3	1-246-416-00	43	1-246-440-00	430	1-246-464-00	4.3k	1-246-488-00	43k	1-246-512-00	430k	1-246-536-00	4.3M	1-244-760-00
4.7	1-246-417-00	47	1-246-441-00	470	1-246-465-00	4.7k	1-246-489-00	47k	1-246-513-00	470k	1-246-537-00	4.7M	1-244-761-00
5.1	1-246-418-00	51	1-246-442-00	510	1-246-466-00	5.1k	1-246-490-00	51k	1-246-514-00	510k	1-246-538-00	5.1M	1-244-762-00
5.6	1-246-419-00	56	1-246-443-00	560	1-246-467-00	5.6k	1-246-491-00	56k	1-246-515-00	560k	1-246-539-00		
6.2	1-246-420-00	62	1-246-444-00	620	1-246-468-00	6.2k	1-246-492-00	62k	1-246-516-00	620k	1-246-540-00		
6.8	1-246-421-00	68	1-246-445-00	680	1-246-469-00	6.8k	1-246-493-00	68k	1-246-517-00	680k	1-246-541-00		
7.5	1-246-422-00	75	1-246-446-00	750	1-246-470-00	7.5k	1-246-494-00	75k	1-246-518-00	750k	1-246-542-00		
8.2	1-246-423-00	82	1-246-447-00	820	1-246-471-00	8.2k	1-246-495-00	82k	1-246-519-00	820k	1-246-543-00		
9.1	1-246-424-00	91	1-246-448-00	910	1-246-472-00	9.1k	1-246-496-00	91k	1-246-520-00	910k	1-246-544-00		

HARDWARE NOMENCLATURE

Screw:



Nut, Washer, Retaining ring:



Reference Designation	Shape	Description	Remarks
SCREWS			
P		pan-head screw	binding-head (B) screw for replacement
PWH		pan-head screw with washer face	binding-head (B) screw and flat washer for replacement
PS PSP		pan-head screw with spring washer	binding-head (B) screw and spring washer for replacement
PSW PSPW		pan-head screw with spring and flat washers	binding-head (B) screw and spring and flat washers for replacement
R		round-head screw	binding-head (B) screw for replacement
K		flat-countersunk-head screw	
RK		oval-countersunk-head screw	
B		binding-head screw	
T		truss-head screw	binding-head (B) screw for replacement
F		flat-fillister-head screw	
RF		fillister-head screw	
BV		braizer-head screw	

Reference Designation	Shape	Description	Remarks
SELF-TAPPING SCREWS			
TA		self-tapping screw	ex: TA, P 3 x 10
PTP		pan-head self-tapping screw	binding-head self-tapping (TA, B) screw for replacement
PTPWH		pan-head self-tapping screw with washer face	binding-head self tapping (TA, B) screw and flat washer for replacement
PTTWH		pan-head thread-rolling screw with washer face	binding-head (B) screw and flat washer for replacement
SET SCREWS			
SC		set screw	
SC		hexagon-socket set screw	ex: SC 2.6 x 4, hexagon socket
NUT			
N		nut	
WASHERS			
W		flat washer	
SW		spring washer	
LW		internal-tooth lock washer	ex: LW3, internal
LW		external-tooth lock washer	ex: LW3, external
RETAINING RINGS			
E		retaining ring	
G		grip-type retaining ring	

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